BUTANE-PROPANE News

HEADQUARTERS FOR LP-GAS INFORMATION SINCE 1931

AUGUST, 1946

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CONTAINERS FOR GASES, LIQUIDS AND SO

BUTANE-PROPANE *News*

Reg. U.S. Pat. Off.

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ELLIOTT TAYLOR, Editorial Director
52 Vanderbilt Ave., New York (17), N. Y. Phone: MURray Hill 2-4504

Publication Office

LOS ANGELES (14)—1709 W. Eighth St.
Phone: DRexel 4337

Branch Offices

CHICAGO (3)—1064 Peoples Gas Bldg.
Phone: WABash 2589
DAVID CARMAN, Manager

NEW YORK (17)—50 East 42nd Street
Phone: MURray Hill 2-4504
L. V. HOHL, Manager

Editorial

LYNN C. DENNY, Editor
PAUL LADY, Assistant Editor
H. W. WICKSTROM, Technical Editor

Executive

JAY JENKINS, President and Publisher
ARTHUR ROHMAN, Vice President
JAMES E. JENKINS, Secy.-Treas.

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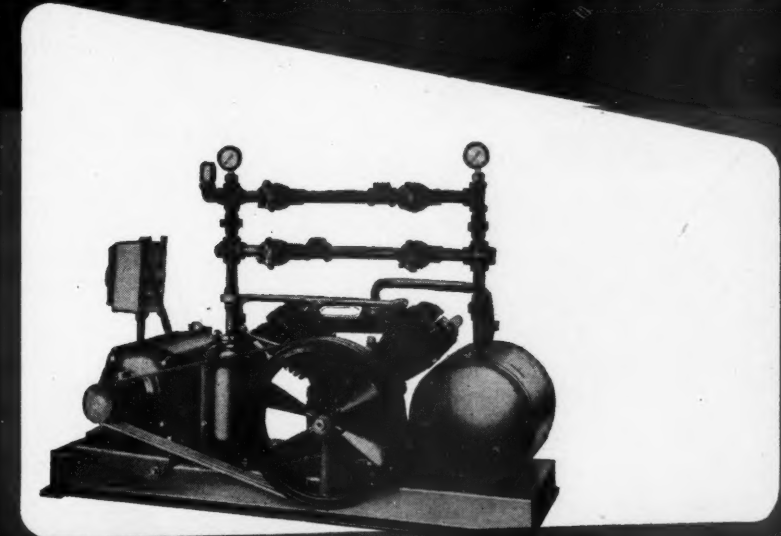
with a RONEY VAPOR COMPRESSOR



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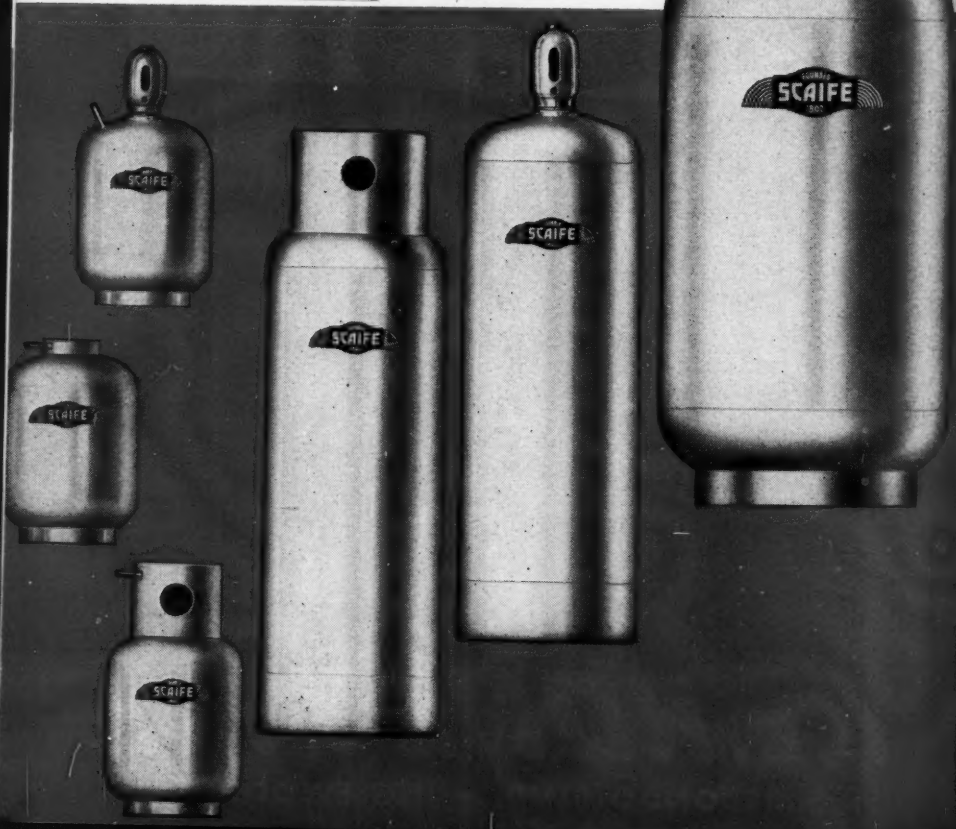

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13½ INCHES WIDE
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WEIGHING ONLY 90 LBS.

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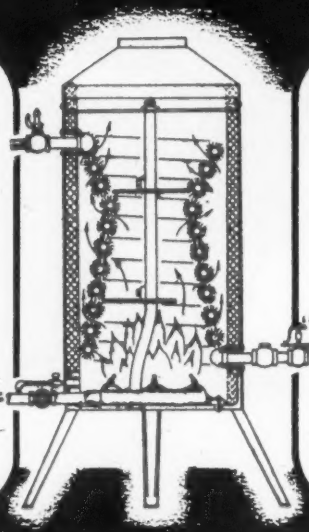

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LETTERS

Gentlemen:

In the April issue of Butane-Propane News the subject of your "Quiz" was "Appliance Conversion." Among other references are some to the Servel refrigerator.

In order to avoid a possible misunderstanding by your readers, I would suggest the following answers to Questions 4 and 10:

Question 4. Can gasoline and kerosene appliances be satisfactorily adapted to gas?

Suggested Answer. Generally not. The one exception is the Servel refrigerator which can be changed from kerosene operation to B-P Gas by the installation of the factory supplied kerosene-to-gas conversion assembly. This conversion assembly may or may not contain a refrigerating unit, depending on the model refrigerator involved.

Question 10. What changes are necessary on a space heater and on a refrigerator?

Suggested Answer. For a space heater a change in orifice size and sometimes additional parts are required in the burners. If it is thermostatically controlled, the addition of 100% automatic main burner and shut-off is required. For a refrigerator the use of a B-P Gas burner with the proper orifice for the model unit involved is necessary.

J. C. Keller, Jr.
Service Manager
Household Refrigerator Division,
Servel, Inc.
Evansville, Ind.

We are glad to present these suggestions to our readers.—Ed.

A. L. Di Giulian and H. R. Gottwald

Gentlemen:

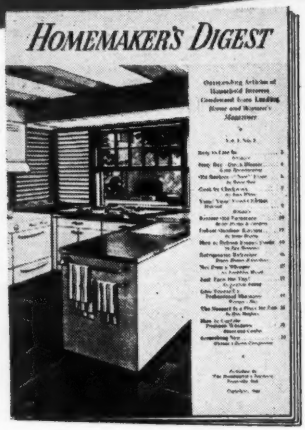
Numerous people within our organization were quite interested in the article on page 143 of the June, 1946, issue of Butane-Propane News, and particularly they were struck by the photograph of our Messrs. A. L. DiGiulian and H. R. Gottwald. Seriously, this has created more comment than would have occurred if the photograph had been used.

We would appreciate your sending us three copies of this issue so that we might forward them to the several people involved. This type of error is only human, and our thought was that you had probably lost the print. We are therefore, enclosing another photograph of Messrs. DiGiulian and Gottwald in the event you would want to run a follow-up in some future issue.

Rockwell Manufacturing Co.
W. F. Weimer
Ass't. Advertising Manager
Pittsburgh, Pa.

We did have a picture, a cut was made from it, and we thought it was in the page until the June book came off the press. The cut has never been found. We offer our apologies, and are glad to run the new photo. One reader, seeing the blank space, said it looked to him like a picture of white swans flying in a snow storm. And it really did.—Ed.

JUST OFF THE PRESS!



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KANSAS CITY OKLAHOMA CITY

COMMENT

AT THE recent convention of the Texas dealers, A. J. Bommer made some arresting statements, of interest to the entire industry. These remarks were labeled his personal opinion and not the voice of the Underwriters' Laboratories, Inc., with which he is associated.

A. J. BOMMER

Mr. Bommer said that in recent months there has been a tendency on the part of state, county and municipal law bodies to consider legislation concerning the storage, transportation and dispensing of B-P gases and equipment. He believes the trend is justified and says dealers should anticipate regulation by first, sound safety practices within the industry, and, second, by cooperating with officials in getting the right kind of rules written into the laws. In part, he says:

"The industry should not resist good legislation but should encourage public officials to enact sane legislation and assume the responsibility of keeping it rather than to fight against it, which looks cowardly.

"Just as sure as the industry sits back in the easy chair and waits, this legislation will be enacted and the acts will likely be written by persons who know nothing of the industry or its operation and, therefore, will be so restrictive as to prohibit operations in many instances.

"On the other hand, if the industry goes ahead and assists with this type of legislation it can get what it wants.

"The writer knows this is a stiff message and intends its contents for no particular one, but rather hopes to paint a picture of what does go on, perhaps in no way intentionally but through lack of knowledge and understanding of what should be done. The future of this industry is as bright as a fresh rainbow if the industry but gets the bit in its teeth and shortens of the checkrein.

"The basis of an ordinance that might be universally adopted should properly come from within the industry, itself.

"Several items well worth remembering along the lines of legislation will be in order.

"The first is that the regulations should adopt some specific standard by which to judge acceptance. Second, the legislation should be reasonable and yet set up high factors of safety for the public. Third, all this should be accomplished without additional taxation."

Some 20 million American homes have no central heating system.

How hot is hot water? Frank McFerran, sales manager of Ruud Manufacturing Co., Pittsburgh, offers his definition: Lukewarm, 90 to 105°; warm, 105 to 120°; hot, 120 to 150°; very hot, 150 to 180°.

Experiments are being made with surplus warplane preheaters to send currents of warm air through growing crops to speed up processing, prevent rotting, and possibly improve nutritional value.

By Ed.

Beyond the Mains

By ELLIOTT TAYLOR

Electric Executives Alerted

We have come across a copy of a new piece of electrical promotion—a report to utility executives on LP-Gas competition—recently released under conditions of secrecy bordering on stealth, and carefully copyrighted by the National Electrical Manufacturers Association.

Since the NEMA refused to let us even see a copy of the pamphlet, we concluded it would be an idle waste of time for us to ask their permission to reprint any portions of it, when by a stroke of rare good fortune we did find a copy of the brochure lying face down on our desk a few days ago. Since no explanation was volunteered as to how it arrived in our midst, no questions were asked.

Without quoting, we can assure the LP-Gas industry that the electrical manufacturers are worried about what is going to happen to the rural market for electrical appliances unless something is done by the utilities to check the eager beavers in the butane and propane business who are out cutting into the prospective purchasers of electric ranges, water heaters and refrigerators. Their solution is to do a Pamphlet Paul Revere, warning the electric light companies that it is up to them to get ready to repel the invaders.

The argument of the electrical manufacturers is sound and it is well documented. First of all, they point out that the national electrical generating capacity has been stepped up enormously as a result of the war time construction. The implication of this new capacity, according to the report, is that it can only be absorbed by a rapid increase in use of electricity in major household appliances. The lighting and small convenience appliance load is almost static, and it is the water heaters, ranges and refrigeration units that must be looked to if the industry is to sell all, or a relatively decent percent, of the new Kwh capacity already built.

The next step in the appliance manufacturers' argument is to point out that it is the small town, rural area field that is

most ready for immediate cultivation. The rapid expansion of rural electrification is one reason, and another is that for the first time in a decade, rural populations are in general out from under their loads of mortgages and debt and ready to spend some of the money that they have, particularly on investments in better living.

A recent compilation made by the Liquefied Petroleum Gas Association, showing that in a period of two months, April 11 to June 11, 1946, nearly $91 million of government funds were allocated for loans to Rural Electrification Administration projects in 38 states, bears out the argument of rural expansion.

The electrical industry has found that in the rural areas sales resistance to the use of electricity for cooking and water heating is unusually low. It is a market that is characterized by single-family owner occupied dwellings. It is a market where, in the past, pushover competition has been encountered. Kerosene, coal, wood and other less convenient types of fuel have predominated. Since it is a market that reacts in direct proportion to the rise and fall of farm incomes, it is one that is now very high in purchasing power.

Dollar figures as an indication of income are becoming increasingly meaningless as OPA-engendered inflation continues to grow. But since the farmers are in the position of producing wanted goods and services, it is obvious that in terms of any evaluation of the dollar, farm income will remain proportionately high until the inflation cycle has run its full course.

In analyzing the U. S. Census, 1940, the electrical manufacturers find that even in the small towns and rural areas, gas is a favorite over electricity for cooking purposes. This they attribute to the aggressiveness with which the LP-Gas industry has met the challenge of its potential markets. And while they are too prudent to tell their own customers the naked truth, we assume that the electrical manufacturers feel that the electric utilities have been asleep at the switch in promoting these rural communities and in following up the electrification of farms.

By way of an interesting comparison it is worth noting in passing that the LP-Gas industry is credited with a rate of expansion that was practically equal to that of the automobile industry in its best years. This is regarded as only a forerunner of what is to be expected (or feared, depending on who is looking at it) once the supply of appliances and equipment begins to flow through in quantities commensurate with the pent up demand for gas service. Categorically stated, the NEMA admits that LP-Gas is already in the big business class, and laying plans to become bigger.

The program recommended to electrical utilities whereby they may be able to stem this flood of

gas buying is to our way of thinking the weakest proposal of its kind that we have seen developed in many a day. Lacking in inspiration and originality, it recommends all of the old tried and true standbys of utility promotion: Pester the customers to death with questions about how they live and where they sleep and why they cook with gas, and see what there is about gas that they don't like. Hound the dealers with inquiries into their merchandising methods, how much it costs to go into the bottled gas business, and how much profit are they making and what have they got up their sleeves in the way of plans for the future.

Having had a little experience in surveying the LP-Gas industry ourselves, we look forward with interest to the flood of honest replies that will come in in response to the question of how many customers are currently served by each dealer.

We are gradually taking a dimmer and dimmer view of the value of these so-called customer surveys. They always seem to turn up only the answers that the surveyors want to hear.

But despite the weak recommendations following the stern and awful warnings to utilities, we do not believe that this or any other indication of an awakened electric industry can be ignored. It cannot be ignored by the gas appliance manufacturers, by the LP-Gas industry or by the gas utilities themselves. One strength of the electrical industry lies in the fact that power plants and generating equipment are often manufactured by the same companies that make down to the smallest of appliances. Thus, promotion money is available on a bigger scale than anything that can be demanded or even expected from the gas industry.

The stodgy view of some of the combination gas and electric utilities, who have successfully blocked cooperative advertising between town gas companies and LP-Gas operators, is another gas industry handicap that the electrical operators do not have to contend with.

But it is our observation that the LP-Gas industry thrives on competition.

The need for a unified front on promotional matters is now pretty generally recognized through the industry and its trade associations. But it is well to recognize that in the eyes of the manufacturers of electrical appliances, the time for action against LP-Gas is now. The report concludes that every utility should set up its plan, and have it going this year, and the year is already better than half over.

The electrical utilities are warned that tomorrow may be too late to head off the competition of LP-Gas. If LP-Gas is as alert to the implications of the impending battle as is the electrical industry, it may prove to be later than the electrical manufacturers think.

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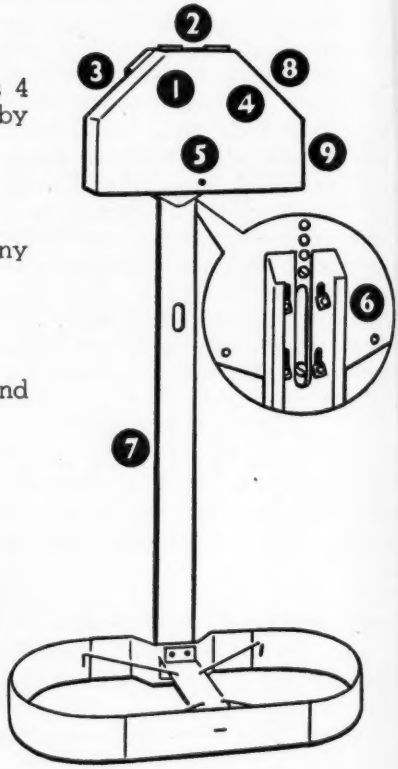

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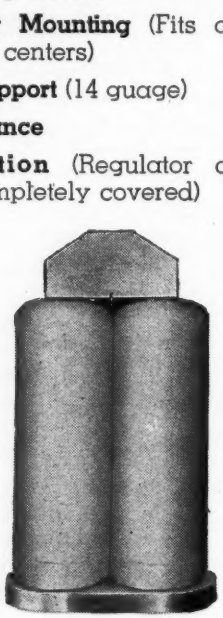

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STAMPINGS INCORPORATED

DAVENPORT, IOWA

Gas Gets the Cooking Load In Shadow of Boulder Dam

By HAROLD W. WICKSTROM*

LAS VEGAS, Nevada, is one of the last frontiers located in a state that still retains its Western ideas and it is the mecca for those from both East and West who have become tired of the work-a-day world and crave the relaxation that can be found in the desert with its spaciousness and its captivating charm —the atmosphere of the Old West with its diversified, informal air.

H. W. WICKSTROM

Reminiscent of the days when men gambled their lives to make a stake in the then forbidding desert, Las Vegas still has the earmarks of the old mining towns, the click of the roulette wheel, the dice dealers' call, the poker table where the cards are held close to the chest, the easy air that comes of a town that knows no difference between evening and dawn except that it is the time to push the button on the switch for the neon sign.

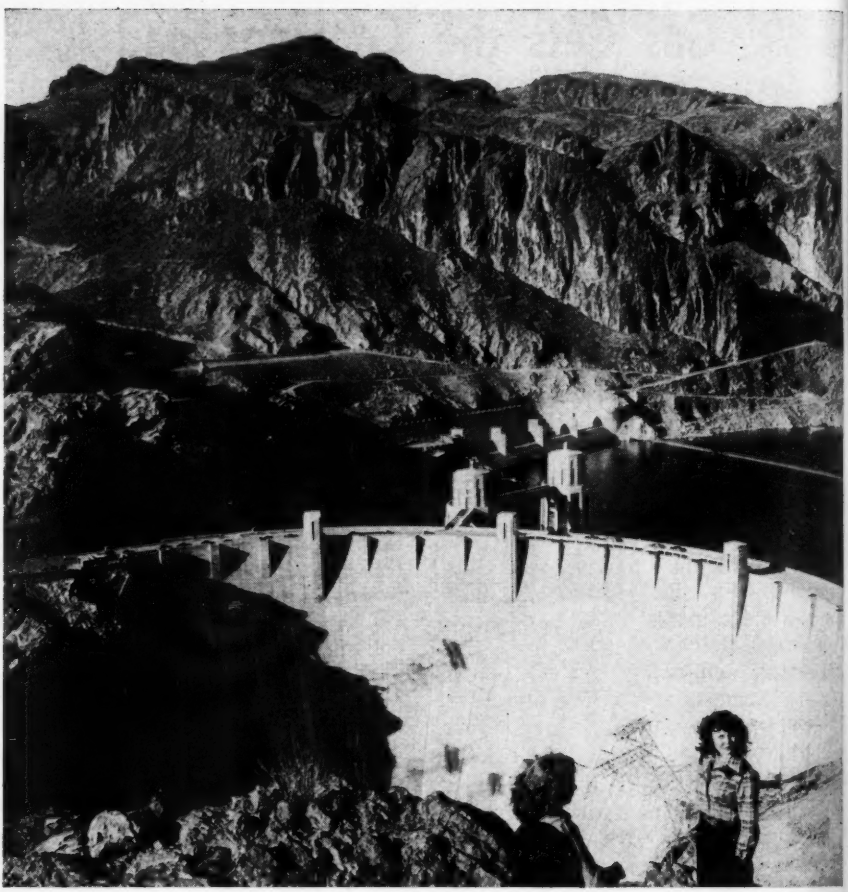
In the days of the burro and the sand trail, the desert was hard. Tough men made up its citizenry. They stayed it out and came to love this land; they worked against the odds of nature and isolation, transferred parts of it into a pleasure land so the less hardy could enjoy some of nature's grandeur at its best, while still being able to retreat to the comforts of an air conditioned hostelry or a pale blue swimming pool surrounded by an extending green lawn and imbibe the luxuries offered by man-made things.

The connection between the desert and the B-P Gas business may seem to be far-fetched but it is not so. B-P Gas has made possible many of the conveniences that have transferred this spot from the raw desert into a wonderful and prosperous play place.

In 1931, Las Vegas was far from being a place any one would go to

---

*** Harold Wickstrom, Technical Editor of Butane-Propane News, is also consulting engineer for the Las Vegas Gas Co. and has followed its development from its origin to date. A forthcoming article will tell of equipping an army camp and 125 houses with all four applications of B-P Gas in the face of real electric competition.—Editor.**



Boulder Dam, source of electric power—which can't compete successfully with gas even in nearby Las Vegas.

without a good reason. It was a hot, dusty, desert town inhabited by railroad men, gamblers, and hardy desert men.

With the coming of the construction of Boulder Dam, it became a boom town in depression days as thousands of workers, lured by the word of employment, migrated to it as best they could and many left with disappointment and disillusionment as it was not a place where the wherewithal could be gained by anything but hard work and putting up with many hardships.

About this time the B-P Gas business was in its pioneering stage and pioneering industry and pioneering country go together. B-P Gas would help to cook a meal, it would keep food from spoiling from the intense heat, it would provide hot water to wash the dust and grime away and it would provide heat to ward off the discomforts of the winter's chilly nights.

The desert offered little wood for fuel, coal was expensive, electricity was beyond the budget of practically all. Oil was the only fuel that most could afford.

The town was piped in 1931 and an undiluted butane-propane mix of 3000 Btu was served. The rates were high and it was a gamble as to whether the investment would be returned before the boom ended.

The old timers were hard to sell. The newcomers were in and out. Regardless of these facts, the load began to grow and by 1936 the system proudly bragged of its 550 meters and its 30,000 to 40,000 gallon peak months. Then the bubble burst.

Boulder Dam was ready. The big construction crews were pulling out. Cheap power would be available and the gas business was sure to fold.

It was time to pull in the belt and face the facts. No one knew what the new electric rates would be, but taking the TVA schedule as what they might be, the rate structure was overhauled with the plan in mind of meeting or bettering TVA rates.

Boulder Dam power arrived and

Recent "Helldorado" celebration on Las Vegas' main street.
All photos with this story, courtesy of Western Air Lines, Inc.

the electric rates were slashed. However, with the usual foresight of the electric utility rate makers, the first 25 KWH rate, which takes care of lighting principally, was set at 4c per KWH with a $1 minimum. The next bracket, that covers refrigeration, was 2.7c KWH; the cooking bracket, 2c; the water heating bracket, 1c.

Average monthly domestic bills for electricity ranged as follows:

Lighting	$1.40
Lights, small appliances, refrigeration	3.00
Lights, small appliances, refrigeration and cooking	6.00
Lights, small appliances, refrigeration, cooking and hot water	8.50

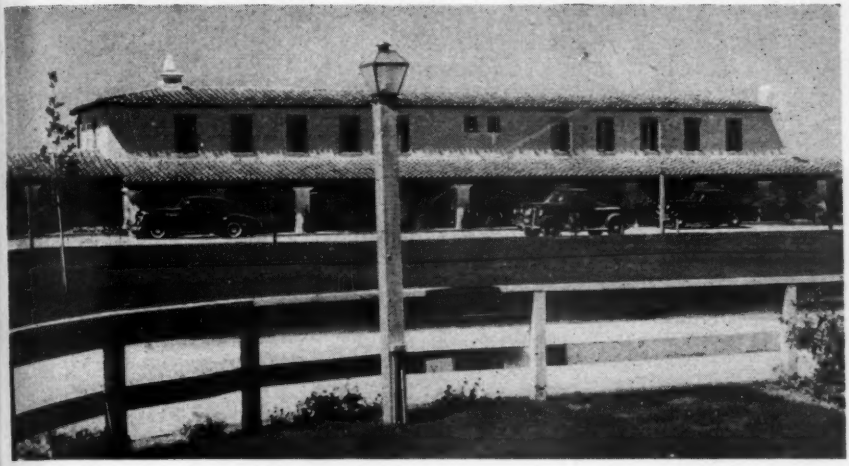
The electric boys had their innings at the start. A few old accounts were lost to them and many prospective new accounts went all electric.

With the reduced rates and the electric competition, the books of the gas company showed a definite reduction in earnings at first but this was surprisingly temporary.

The public was cost-minded. It was still depression time and within six months the effect of the lowered rates and the fact that the kilowatt lads had exaggerated a bit, started to show up in the customers' bills. This changed the tide and the gas load started to increase. New connections became more regular and inside of a year the net earnings were greater than any time before.

Competition has a spurring effect. There were many restaurants in the town. Most were operating

The swimming pool of El Rancho Vegas, de luxe desert resort, which uses liquefied petroleum gas in its kitchens.



Front view of El Rancho Vegas.

on stove oil and it was hard to win them over to gas. They had hesitated in making new investments in kitchen equipment till Boulder Dam was ready.

Practically at once one restaurant went all-electric and all the rest kept an eye on it—and we did too, with some timidity.

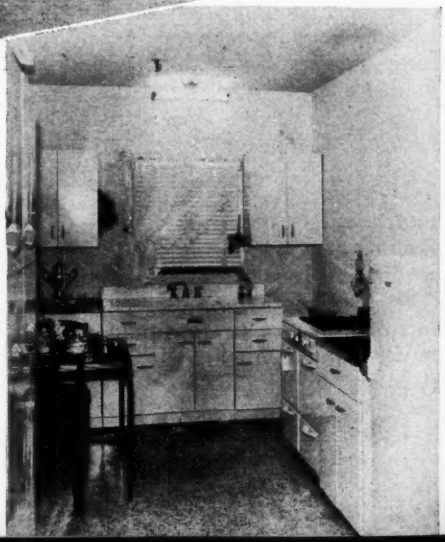
Now we feel that the best salesman we had working was this outfit. Today 98% of the restaurants are all B-P Gas cooking and water heating and there are many eating establishments ranging from 10-stool counters to luxurious dining establishments burning the same fuel.

B-P Gas was right and won out in the long run over both oil and electricity for the commercial load. Its inherent superiority—its ability to instantly deliver its full heat energy, or any degree thereof through fine control, cause restaurant men to favor it over all other fuels.

What is true for the commercial user is true for the domestic user but in a less spectacular way. The same benefits that butane and propane give to the commercial operator occur in the home and the fact that the gas company can point to these installations is a great help in discounting some of the claims and propaganda of our electric friends.

They are sales minded and have a lot of tools to work with but they have 3 Achille's heels. That is, they are second best in performance, second best on first cost and second best on operating cost when competing with B-P Gas.

Las Vegas is growing with the West. The B-P Gas business is expanding with the town. Where in 1936 a 40,000 gallon month was quite something, now an 18,000 gallon day is taken in stride and just what the figures will be 10 years from now, we do not know but we definitely are not afraid of the shadow of Boulder Dam.



▲

The Polar Gas Co. opens its new offices in Orlando, Fla. Top: Outside view of entire building. Center: Office and sales room. Bottom: The demonstration kitchen, completely equipped.

▼

"Good Front" Brings 'em In

GOOD appearance pays!

A new office building, attractively painted, plenty of bright lights—and the crowds come.

Of course, there's something inside they want to see, and in the case of the Polar Gas Co., Orlando, Fla., it is new, liquefied petroleum gas appliances and equipment.

The Polar Gas Co., after 16 years of constructive effort in the central Florida field, has recently erected a building specially designed for sales and service. The center of attraction —to women, at least—is a demonstration kitchen where prospects can see for themselves the operation of new appliances on B-P Gas.

"We are swamped with calls for new appliances and systems," says H. G. Lindsay, owner of the business he has built from ground up, "and the future is bright."

Mr. Lindsay started out 16 years ago with a small propane bottled gas agency, adding butane a few years later. It was a side issue to his bottled water business at first but quickly the demand for household conveniences beyond the city mains prompted him to close out his water customers and concentrate on liquefied petroleum gas. It proved to be a good move.

At the present time the Polar Gas Co. is featuring radiant heating from pipes in floors, walls and ceilings of homes. This kind of a system is installed in the new office building.

Bulk plant capacity is great enough to receive four tank car shipments at one unloading, ensuring customers of ample fuel supplies in cold weather.

At the opening of the new headquarters the company gave customers and prospects copies of Servel's "Homemakers Digest," handmade pot holders with "Polar Gas Co." embroidered on them, and barrel type pencils carrying suitable advertising lines.

Sebring, Fla., Town Plant Extends Service Beyond Mains

Because of the high cost of extending the mains at this time and the difficulty in obtaining materials, the Sebring butane gas plant has announced that it would provide butane gas for heating and cooking by the installation of tanks at the homes of residents not along the route of the mains.

The municipally-owned gas company will install a 106-gallon tank filled with gas, and one connection, for $114. Additional gas will be furnished at the rate of 30 cents per gallon for the first 10 gallons, and 20 cents for each additional gallon.

The present plant was designed to serve normally about 450 customers. The number of customers being served however, is nearly 650.

Piedmont Gas Co. Establishes Business in Liberty, S. C.

The Piedmont Gas Co., Liberty, S. C., has been granted a charter to engage in the liquefied petroleum gas business.

James M. Beeson is president and treasurer; William B. Beeson, Jr., vice president and William B. Finney, secretary.

The capital stock of the company is $15,000.

Liquefied Petroleum Gas State Associations And Their Officers

Arkansas Butane Dealers Assn.
B. T. Harris, President,
Butane Gas Co., Inc.,
1120 W. Mockham Street,
Little Rock.
R. C. Weiss, first vice-president,
Wheatley.
Miss Mary Nell Wallace, secretary,
Little Rock.

Colorado Liquefied Petroleum Gas Assn.
Harry H. Torbit, President,
Union Gas & Equipment Co.,
191 Central Main Street,
Pueblo.
George Cummings, 1st Vice-President,
Cummings Gas & Equipment Co.,
Gunnison.
T. H. Anderson, Secretary-Treasurer,
124 West 14th Street,
Denver.

Florida Liquefied Petroleum Gas Assn.
Willard Ware, President,
Gas-Air Products, Inc., of Florida,
Coral Gables.
Charles H. Rogers, Jr., Vice-President,
Ocala.
Harry C. Price, Secretary-Treasurer,
Green's Fuel of Florida, Inc.,
Sarasota.

Georgia Butane Dealers Assn.
Hermann Paris, President,
P. O. Box 88,
Sandersville.

Kansas Liquefied Petroleum Gas Assn.
H. R. Seacat, President,
725 Commercial Street,
Emporia.
Jess L. Newkirk, Secretary-Treasurer,
Newkirk Electric & Supply Co.,
Caldwell.
T. J. Knowles, Vice-President,
Galva.
R. H. Mahnke, Executive Vice-President,
414 Kaufman Bldg.,
Wichita.

Louisiana Liquefied Petroleum Gas Assn.
Quentin Jones, President,
Butane Gas Co.,
Houma.
John R. Holicer, Vice-President,
Box 590,
Shreveport.
Hamlet D. May, Executive Secretary,
P. O. Box 1871,
Baton Rouge.

Missouri Liquefied Petroleum Gas Assn.
W. A. Schuette, President,
P. O. Box 88,
Eldon.
Norma Stearns, Acting Secretary,
Eldon.

New Mexico Liquefied Petroleum Gas Assn.
Allen T. Hood, Secretary,
Hood Petroleum Co.,
Lordsburg.

Oklahoma Liquefied Petroleum Gas Assn.
Carl Ticer, President,
Woodward.
Fred L. Yates, Secretary-Treasurer,
224 Commerce Exchange Bldg.,
Oklahoma City.

Texas Butane Dealers Assn.
Lyle Blanton, President,
Hereford.
H. C. Pitman, Vice-President,
Tyler.
William J. Lawson,
Executive Secretary,
508 Littlefield Bldg.,
Austin.

Pumping Water With B-P Gas *DRIVES*

By C. M. DENTON

Chief Engineer, Pacific Tanks Co., Los Angeles

THIS article will pertain to the drive or power transmission for pumping installations using internal combustion, butane- or propane-fired engines ranging in horsepower from 18 to 100 bhp.

C. M. DENTON

There are several methods of driving pumps. The most important, three in number, are (1) gear drive, or right angle direct connected head; (2) V-belt drive, and (3) flat belt drive. Of the foregoing systems, the one most commonly used in efficient installations is the right angle gear drive head.

The operation of this system, or head, is as shown in the accompanying picture and, as can be seen, is comparatively simple. A live shaft, direct connected to the engine, transmits power to a beveled gear, which in turn drives a companion gear, affixed to the pump head shaft. The gear ratio of these units can be varied to turn the pump shaft at the speed required and permit the engine to run at its most efficient speed. Normally, this ratio on internal combustion engines is about 2½ to 1.

Units such as the one shown have extremely high efficiencies. In some instances efficiencies on these units are as high as 98½% with only ½% friction loss. Their operation is practically trouble-free in view of the fact that the entire mechanism of the unit is completely housed in a steel case and the moving parts are bathed continuously in oil. The application of the geared head normally is determined by several factors and, as an example, we will apply a geared head to the pump specifications and curves given in the preceding article on pumps.

By referring to this article, Page 40, June issue, BUTANE-PROPANE *News*, we will find that the pump must run at a speed of 1765 rpm, as shown on the pump data sheet, to give the required volume of water at maximum efficiency. This requires 64 bhp, or brake horsepower, actual.

In other words, the 64 brake horsepower is the requirement of the pump head to turn the shaft at 1765 rpm without any friction loss in transmission between the source of power and that shaft. Therefore,

to this horsepower we must add the friction loss of the geared head which, in this particular case, will be 2%, or adding this 2% friction loss to the required brake horsepower, we will require approximately 65.5 brake horsepower.

In sizing the gear head we must know the optimum speed of the engine and its brake horsepower rating. This will be explained in a later article. However, for the example at hand, we will use an engine that turns approximately 750 rpm, at which speed it will develop 75 hp, which will be more than ample to take care of the pump in question.

That means that 750 rpm divided into 1765 rpm at which the pump must turn will give us a gear ratio in the gear head of approximately 2.3 to 1.

This information is given merely to demonstrate the method of applying the power to the pump, and in the usual instance the company or the pump dealer that furnishes the pump will also furnish a properly sized geared head.

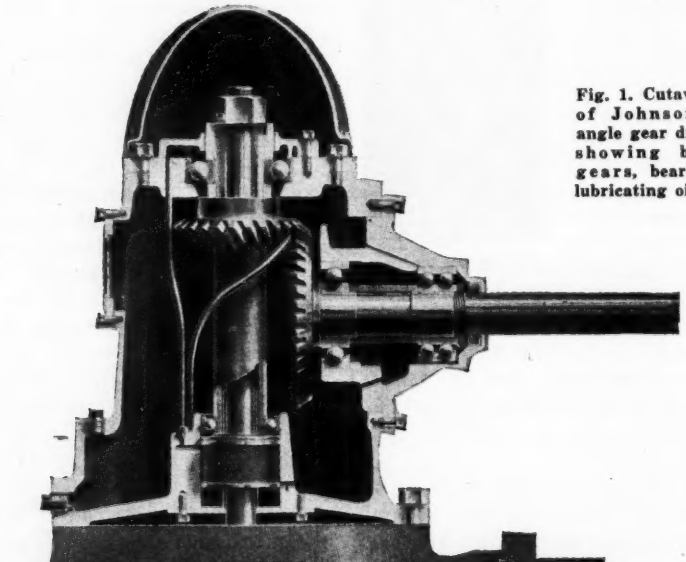


Fig. 1. Cutaway view of Johnson right angle gear drive head showing bevelled gears, bearings and lubricating oil system.

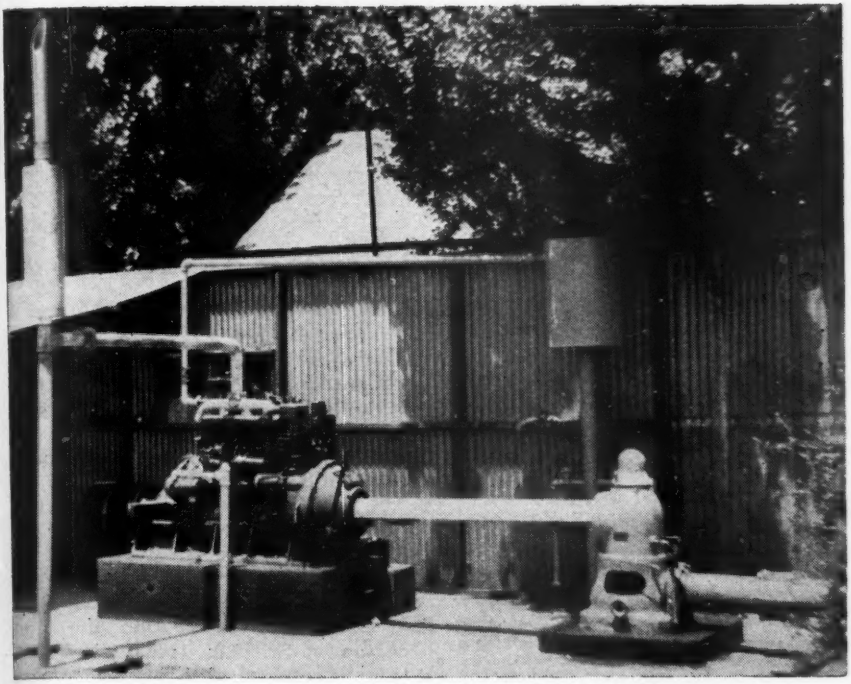


Fig. 2. Installation of pumping unit with right angle gear drive head attached to Layne-Bowler deep well turbine pump.

However, it will be necessary to have the information from the butane-propane dealer as to the size and rpm of the engine he intends to furnish, and it is extremely important that the dealer furnish the pump company or the pump dealer the exact specifications of the engine he intends to install. He should then check the pump company's specifications of the geared head to be entirely sure that the pump company has correctly sized the gear drive to the engine he intends to furnish.

The other methods of drive mentioned are the V-belt and the flat belt. These are probably the most common in field use throughout the country. However, in the last five years the trend has been away from this type of drive to the more efficient and positive gear drive as mentioned above.

The use of the V-belt has one prime objection and that is that the slippage efficiencies or the overall friction loss on the use of a V-belt sometimes amounts to as much as 7%, and on a flat belt it will

amount to as much as 20% on particularly poorly applied installations.

The usual formula for determining V-belt and flat belt drives should be adhered to in sizing an engine to a pump with this type of drive and consideration should be given to the fact that on the example mentioned above the drive pulley should be not less than 13 inches in diameter and the belt speed should not exceed 2800 feet per minute. In this particular case it would require 6 V-belts having a belt top width of 1¼ inch, and a belt thickness of ¾ inch. Under no circumstances should V-belt ratings given by various belt manufacturers be overloaded beyond 2% to 3%.

THE PRIMARY PURPOSE of this series of articles on irrigation pumping with engines burning butane or propane is to provide dealers with basic information so that they may acquire this type of load in competition with other engine fuels.

There is no better or faster method of developing summer load than through sales of B-P Gas for agricultural operations—tractors, trucks, stationary engines, hay and grain drying, flame weeding, cotton ginning, etc. Dealers who familiarize themselves with such applications can present constructive sales facts which will bring them increased volume.

Irrigation pumping is practiced in numerous localities throughout the country. It makes an ideal summer load.

Charles M. Denton is exceptionally well qualified to discuss this field, having made many such installations in the field. He is a mechanical engineer of wide experience.—Editor.

In the above installation mentioned we will assume a 5% friction loss for the V-belt which will mean that the 75 horsepower engine will still be satisfactory. However, on a flat belt the engine horsepower requirement would be increased to 78 brake horsepower.

In the next article we will consider engines and horsepower ratings or engines.

Minngas Co. Sells Town Plants In Kirksville, Brookfield, Mo.

The Missouri Minngas Co., with offices in Kirksville and Brookfield, has been sold by the estate of the late H. H. Henley, of Tracy, Minn., and the new owners have taken over the management of the company.

R. E. Crawford, of Minneapolis, is president of the company and the other officials are A. W. Scofield, of Mankato, Minn., vice president and general manager; N. H. Nitzkowski, of Mankato, secretary, and A. O. Anderson, of St. Paul, treasurer.

Mr. Crawford also is president and Mr. Scofield is sales manager of the Minnesota Valley Natural Gas Co., which has served 14 cities and town in Southern Minnesota with straight natural gas for the past 12 years.

During June Mr. Scofield was in Kirksville and Brookfield looking after company affairs. He stated that the shortage of materials greatly has affected the progress of the changeover from manufactured to liquefied gas which was started last year by the former owners. It is expected that the changeover will be completed within the next month.

Harvey Gigstad will continue as resident manager and plans have been formulated to open an operating and accounting office in Kirksville. Previously, most of this work has been done in the office at Tracy, Minn., former headquarters of the company.

Kansas Association Plans Drive To Double Membership

ANNOUNCEMENT has been made by H. R. Seacat, president of the Kansas Liquefied Petroleum Gas Association that R. H. Mahnke, of Kansas City, has been hired as executive vice president of the Kansas association, effective July 1. He will establish State offices for the association in Wichita.

Mr. Mahnke was selected by the board of directors of the association at a meeting held in Wichita early in June to carry out an aggressive and expanded program for the Kansas association. Mr. Mahnke has had several years experience in the natural gas business, having served as merchandise manager for the Kansas Electric Power Co. in Parsons and Leavenworth, Kan.; however, he is new in the LP-Gas field. He has just completed three and one-half years service in the U. S. Army. He is 38 years old.

The Kansas Liquefied Petroleum Gas Association was organized in a limited fashion approximately six years ago by the bulk fuel distributors. With the closing of the war, the association has been expanded to offer membership to any person engaged in the butane and propane business in Kansas, and includes every type of LP-Gas business in the State. The purposes of the association are:

1. To promote and develop the liquefied petroleum gas industry in Kansas and to coordinate its activities to the end that it may serve to the fullest possible extent the best interests of the public.

2. To promote an educational program to familiarize the L-P Gas State dealers with all the rules and regulations related to the industry, and to insure proper handling of the fuel according to recognized safety standards.

3. To promote favorable publicity and fair legislation.

4. To promote regular State and district meetings and an annual convention.

5. To stimulate collaboration and cooperation between the members of the association as well as with similar organizations.

H. R. SEACAT

R. H. MAHNKE

At the present time, the association has more than 100 memberships. A membership drive is now in progress with a quota of 200 members. The directors and officers of the association are:

H. R. Seacat, Seacat's Gas Service, Emporia, president.

T. J. Knowles, Butane Gas Delivery Service, Galva, vice president.

Jess Newkirk, Newkirk Electric & Supply Co., Caldwell, secretary-treasurer.

Carl Deatz, Deatz Sons, Hutchison, director.

Si Darling, G. B. Darling & Sons, Pratt, director.

The State has been divided into six working districts. District chairmen are:

F. N. Emmons, Butane Gas Delivery, Pauline. Northeast Kansas.

Neal Havens, Union Gas Co., Independence. Southeast Kansas.

George McClellan, Salina. North-Central Kansas.

Eli Worden, Worden Appliance, Winfield. South-Central Kansas.

Glen Humburg, Humburg Lumber Co., LaCrosse. Northwest Kansas.

Charles White, Skelly Oil Co. Southwest Kansas.

Coral Gables, Fla., Levies Heavy Tax on Gas Sales

A utilities tax for Coral Gables, adopted June 18, places a levy on electric, water, telephone and bottled gas bills, effective Aug. 1. It is estimated to produce $50,000 annually.

The ordinance imposes a tax of 10% on the first $25; 5% on the next $25, and 1% on all over $50.

A levy may later be placed on fuel oil used for cooking or heating.

Cy Carney Incorporates Firm To Engage in B-P Gas Sales

The Cy Carney Appliance Co., Fayetteville, Ark., has filed articles of incorporation with the Secretary of State in Little Rock to deal in butane and propane gases and equipment.

Authorized capital stock is $50,000. The incorporators are Cy Carney, Cy Carney, Jr., and Lettie Carney, all of Fayetteville.

Oklahoma LPGA Sponsors S. W. Gas Appliance Show

Plans are maturing rapidly for the completion of the program which will be presented at the annual fall convention of the Oklahoma Liquefied Petroleum Gas Association in Oklahoma City in September.

FRED L. YATES

Invitations have been sent to dealers in all neighboring states to attend this meeting which will give the occasion the significance of a district meeting rather than one limited to state boundaries.

In connection with the convention, the Association is also sponsoring a "Southwestern B-P Gas Appliance Show," to which are invited fuel distributors and appliance dealers from the eight Southwestern states. The dates for this show are Sept. 18-21, inclusive. The Association convention, itself, will extend from Sept. 19-21.

All exhibits for the Southwestern Appliance Show may be held over for the Oklahoma State Fair occurring September 21-28. Exhibitors who have space at the B-P Gas show will not be charged additionally for displaying at the State Fair. It is expected the attendance will total 350,000 for the State Fair.

There's More To Pumping Liquid Than a Pump

By CHARLES M. CORKEN
Corken's, Oklahoma City, Okla.

BECAUSE most of you* are managers, owners and operators of your own B-P Gas business, you may feel that any technical discussion of problems of pumps were better given to the superintendents or mechanics of your organization.

CHARLES CORKEN

However, I assure you that you cannot become too interested in the vital part pumps play in the efficient and safe operation of your business. Pumps are more important than you think, because too many of you have taken for granted the inefficient liquid moving occurring in your plant, inasmuch as you have nothing with which to make comparison.

Can one of your delivery trucks fill a 500 gallon aboveground tank in 10 minutes, or does it take 20, 40 or 60 minutes to do it?

At your bulk plant is it possible to fill a delivery truck in 15 minutes? If not, time it and see how long it is taking and what size motor you are using.

Fast movement of the liquid is possible, but it requires more than a pump to get the job done. Proper selection of pipe, valves, fittings, excess flow valves, discharge fittings, hose sizes, all enter into the efficient movement of liquid.

How to Get Extra Pressure

This is a good time to mention equalizing. Equalizing is extremely important and not just for the purpose of reducing pressure in the storage tank, but primarily to get that extra pressure over into the supply tank to increase the positive liquid head in the inlet of the pump.

To accomplish good equalizing requires better than ½" hose, except in a very few rare instances where you are pumping into small containers, and I say this, in spite of the fact that possibly the equalizing connection in your tanks may be ½". I would recommend not less than ¾" equalizing hose be carried on delivery trucks and that wherever a transport is used that the

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Substance of a paper delivered before the June 24 meeting of the Colorado Liquefied Petroleum Gas Association at Gunnison.

equalizing hose be 1", and, of course, on a transport if the tanks are equipped with ½" equalizing valves they should be increased to the largest available.

Poor Installations Are Costly

You can't make a better investment in your equipment and bulk plant than using sizes and types of pipes, valves and fittings which make it easy for the liquid or the gas, as the case may be, to move from fitting to fitting and I am sorry to report to you that an investigation of bulk plants from Illinois to New Mexico revealed only one plant in the whole group that could be termed 90% correct. All the rest of them could have profited by major changes. But the surprising thing in that survey was that the operators of poorly designed plants were pretty well satisfied and were not agreeable to thinking of making an investment which would change those plants to operate efficiently.

You are not to be censured for improperly installed plants and truck pumps because you have not had available experienced engineering knowledge to aid you in making proper installations. On the West Coast, they have had an advantage over us back in this country because there is a pump manufacturer, R. Stanley Smith, who devoted all of his time and attention to correcting the mistakes of the industry, and Mr. Smith is certainly to be commended for the great effort he has made in bringing proper practices to our attention.

The reason our little organization was not satisfied just to sell pumps to you and, therefore, created an engineering department for designing pipe work, was that we knew there would be no advantage in selling you pumps for 100 GPM, for instance, when you might, and in all likelihood would, pipe them so they could only receive 50 GPM of liquid. Even under those circumstances we have to be careful—for instance, one of the largest bulk plants we have installed was designed for rapid unloading and fast loading, because it was in an irrigation district where they wanted to handle better than 300,000 gallons a month of gas. A plant was designed for this purpose and equipped with a 5 HP motor driven pump and we supplied everything, except the equalizing hose, and that, the customer said, he had.

Larger Hose, Larger Capacity

When the plant was first put into operation it did not meet the capacity guaranteed; an investigation revealed they were using ½" equalizing hose. At that moment there was no 1" hose available, but there was ¾" and that was used and stepped the capacity up from 35 GPM to 55 GPM unloading transports.

And as soon as 1" hose could be put into service, it increased the unloading capacity to 90 GPM. All this time, the owner had an investment in a plant capable of rapid movement of liquid, but for the lack of the correct size, inexpensive hose, the whole, huge investment was only producing half of its value.

QUIZ — Competitive Fuels — Wood

• *This department is a monthly feature to stimulate thought and to give operators basic industry facts. Clip out for your notebook or file in a standard, 3-ring, loose-leaf binder. Sources of information: The Bottled Gas Manual, Handbook Butane-Propane Gases.*

Questions	Answers
1 **Is B-P Gas competitive with wood as a fuel?**	B-P Gas is competitive with wood in many instances, and installations are being made regularly in areas where there are large suppliers of relatively low priced wood for fuel.
2 **How is it possible to compete with high priced bottled gas?**	Bottled gas can sell for prices up to 11 or 12 cents per pound in competition with wood for cooking and water heating due to the higher efficiency of utilization of the available energy in the fuels and the added convenience of gas fuel.
3 **What is the reason that gas can compete with wood?**	The cost of wood is constantly increasing due to the cost of labor to cut and haul it. Even though the prospective customer has wood available on his land, in many cases the time required to handle it is greater than the cost of B-P Gas as a fuel.
4 **What other factors have helped make B-P Gas competitive with wood?**	Education of the rural public through publicity and advertising of modern home conveniences has created a market for products of our industry that cannot be successfully met by any wood burning appliances.

5

What is the best field for the B-P Gas dealer to cover in a wood competitive area?

The best group upon which to concentrate is the income class that can afford or are thinking of installing electrical appliances. Every ad for an electrical home installation or appliance is an ad for a modern home and selling the superior qualities of a modern gas home is the job of the B-P Gas dealer.

6

Is there a chance for B-P Gas installations in the marginal income groups where cost of operation is still more important than home convenience?

Selective determination of utilization equipment such as a gas range and a side-arm booster heater often will be possible and can result in establishing gas in the home, with the prospect of a modern, complete, gas installation in the future.

7

How can the cost of B-P Gas be compared with the cost of wood for estimating purposes?

For cooking and water heating, it will require a cord of good hard wood to do the work that can be accomplished with 100 pounds of propane.

8

In wood burning areas what commercial load is economically converted to B-P Gas?

Roadside restaurants, tire vulcanizers, bakeries, steam cleaners, motels and auto camps, and many similar industries that can be benefitted by the use of gas in the quality and variety of the end products made and the saving in time and labor in their production can show a large overall saving in operation by the use of B-P Gas.

9

What other factors enter into the cost of burning wood besides the cost per cord of the fuel?

Time required in tending the fires and removal of ash, cost of cleaning due to dirt from the ash, maintenance of stove pipes, chimneys and flues, space required for storage, deterioration of utilization equipment due to unevenness of burning, and loss quality and value of end product due to variations in heat during different periods of combustion.

10

What is the relative safety of B-P Gas versus wood burning appliances?

B-P Gas is safer than wood as a fuel. Wood burning causes more fires than any other rural fuel due to chimney fires, overheated wood work adjacent to stoves, sparks and hot coals dropped on wood floors and rugs and explosions in so-called "air tight" stoves.

● Competitive Fuels ● Wood, Coal, Oil, Electricity ● Gas Lighting ● Space Heating ● Tools for Your Kit.

Railroad Air Conditioning With Propane

IF our building trades kept in step with the progressiveness of our American railroads, our homes would be more comfortable and healthful.

Take the matter of air conditioning. The average so-called "air conditioning" plant installed in our homes is nothing more than an old-fashioned hot air furnace in a dolled-up form, with air filters and electric blowers attached thereto.

Humidification is accomplished by passing the air over, or through, water. Cooling in the hot summer months is supposed to be accomplished by blowing unheated air through the heating system. If the air intake is located in a dank cellar some cooling of the house may be accomplished until such a time as the cellar is heated by hot air, which necessarily is drawn into it to replace that which has been expelled by the blower. If such is an air-conditioning system in the modern sense, then it is equally true that the old horse-drawn buggy becomes an automobile when an engine is attached to it. Please mark well these comments for consideration at a late point in this chapter.

Why American Railroads Were Driven to Air Conditioning. American Railroads were forced into air conditioning of their passenger coaches by competition from the automobile. A modern steel passenger coach, even though it is well insulated, has all of the qualifications of a fireless cooker when it is sidetracked in the glare of the sun on a hot summer day. The very insulation which is supposed to keep the heat out also keeps the heat in, once it has seeped through into the interior of the car.

Travel by rail in the summer time once was anything but pleasant, for even if a relieving breeze might be had by opening the windows when the car was in motion, one would end his trip as grimy as if he had sweat a night out in a coal bin.

Railroads suffered immense losses in passenger traffic because travel by automobile was more comfortable and pleasant. Their first step in the right direction was the in-

By C. C. TURNER

Special Representative
Butane-Propane News

Ice engine and engine generator slid out for inspection from beneath a car on the Southern Pacific. Note that all connections are flexible so that it requires but a few seconds for inspection.

stallation of electric fans which helped, even if they didn't do much but stir the hot air and dust.

The next step was the installation of ice bunkers, through which drafts of air were blown over the ice into the cars. This was a distinct improvement over the fans, but ice was not always available in some localities, and the cooling accomplished was expensive. Some railroads still stick to the ice-bunker idea, but the more progressive roads have installed individual ice engines on each passenger coach, these engines being fueled by propane.

Relative Operating Costs of Ice Bunkers and Ice Engines. Perhaps these progressive railroads are more shrewd than altruistic. Thanks to the efficiency which a pioneer in this field, the Waukesha Motor Co., has built into its units, a mere 100 pounds of propane can be converted into cooling which is equivalent to that provided by 5 tons of ice!

Now, in any locality you can't figure the cost of ice at much less than 35c per hundredweight, so 5 tons of ice would cost at least $35. In other words, on a break-even basis, propane could be sold to the railroads at 35c per pound for air conditioning purposes.

Even at this price, there are certain other more or less indefinite savings in operating costs by which the railroads would gain. It certainly requires less time and causes less mess to install a 100-pound cylinder of propane beneath a railroad coach than to load 5 tons of ice into a bunker.

The deterioration of ice storage bunkers is rapid. A Waukesha ice engine weighs but 1650 pounds as against 10,000 pounds for 5 tons of ice, besides costing the railroads a pretty penny to haul this dead weight. Any efficient cooling system, including even the ice bunker method, requires a blower system. If the railroads are to fool with mechanical cooling devices, they

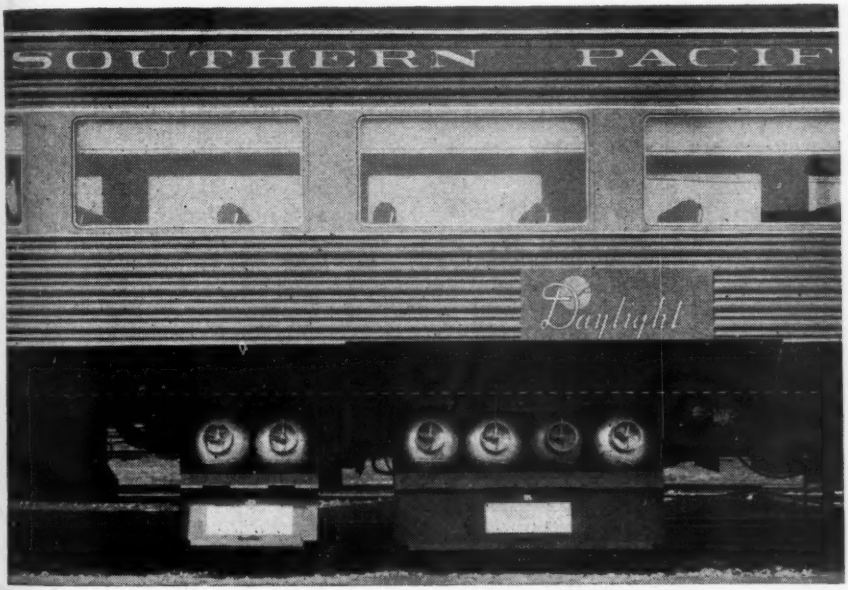
might as well go the limit and have the entire cooling unit mechanical.

The Waukesha ice engine even speeds up train schedules, for sufficient propane gas can be quickly stored beneath a passenger coach to take care of an entire trip from terminal to terminal, but with natural ice frequent stops are necessary for re-icing. The factors of operating cost, maintenance expense, convenience, cleanliness, comfort, dependability, space saving, and deadweight haulage, are all in favor of the ice engine!

What Is A Railway Ice Engine? Fundamentally, it is nothing but a mechanical refrigeration unit, the design of which has been adapted to railway coach usage. Its principal elements are a four-cylinder, propane gas-fueled, internal combustion engine and a refrigerant compressor of the reciprocating pump type.

The compressor is driven by the engine through multiple V belts, and the cycling of the refrigerant through vaporizers and condensers is just the same as in any household refrigerator. Temperatures are automatically controlled and the compressor started and stopped by electrical control devices.

The power unit being self contained, there is no drag upon the train's motive power, and a coach may be set off on a side-track inde-



Propane cylinder installed under one of the coaches of the Southern Pacific lines. Each cylinder will operate an ice engine for 20 hours.

pendent of a locomotive and air-conditioning is continued for the benefit of the occupants.

Why Not Electric-Driven Compressor Units? The demand upon a passenger coach cooling system may be tremendous. Approximately 20 horsepower may be required under extreme conditions. As any passenger coach cooling system would be worthless if it was inoperative when the coach was not in motion, any electric driven system would either have to be dependent upon storage batteries or a single electric plant located somewhere in the train, presumably in the locomotive. At terminal stops a method of plugging in to a local electric supply would in this event be necessary.

If a storage battery system were used, the weight of essential batteries would be nearly 3 tons, and the regular servicing of these batteries, plus their replacement every two to three years, would constitute a prohibitive expense.

Inasmuch as the efficiency of storing electric energy in storage batteries in comparison with any direct power application is extremely low, the drag upon train motive power would be far in excess of the power actually required for cooling purposes. Electric-driven compressor units are definitely out of the running in passenger coach applications for these and many other reasons.

Railway Ice Engines Already Have Wide Acceptance. Lest you think that the propane-fueled ice engine is merely something that is in the experimental stage, let me assure you that it is already extensively used by at least 22 major railways in the United States, Canada, and Mexico. Perhaps, because of the extremes of conditions under which ice engines have been required to operate upon the Southern Pacific railroad, their experience may be of most interest to you.

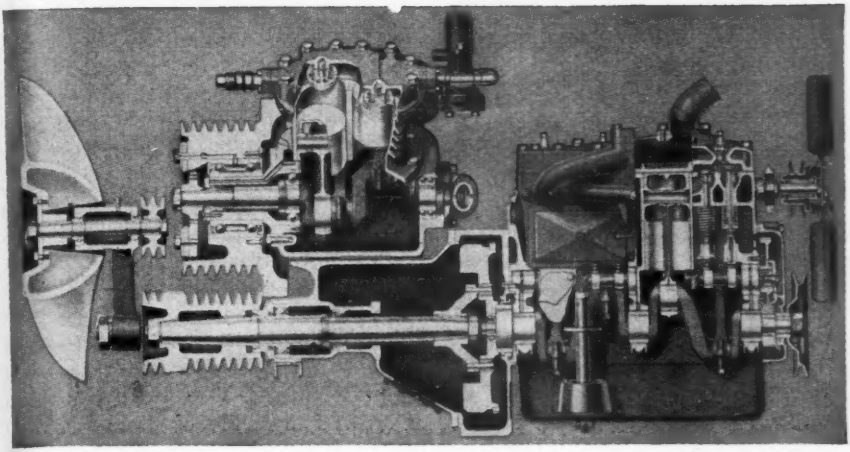
To B. M. Brown, general superintendent of motive power, I am indebted for the information which has been furnished by them. Southern Pacific's lines range from 200 feet below sea level to 6800 feet above sea level.

Temperature Extremes Encountered

Temperatures encountered are from 20° below zero to 120° above. Certainly such conditions impose most exacting demands upon the dependability and efficiency of the ice engine. What follows is a record of the ice engine under these conditions upon their lines.

In 1936 four air-conditioned coaches were equipped with Waukesha ice engine units. Results were so gratifying that 62 additional units were installed in 1937. In 1939 there were 28 units added. In 1940 there were placed in operation 17 more units. In 1941 the Railway purchased 55 more units. During the war years no more units were installed because they were not available, and in 1946 to date but 1 unit has been installed because of difficulty in obtaining them.

This makes a total of 167 railroad-owned cars now operating on the Southern Pacific lines. Of this number 71 are also equipped with Waukesha 7-½ KW, 40-volt engine generators. In addition 11 cars which are owned jointly by the



Cross section of railroad ice engine, showing principal features of construction.

Union Pacific and Chicago & Northwestern railroads are equipped with both ice engines and engine generators, and operate in the crack train *"City of San Francisco."*

In addition to these 178 units for which the Southern Pacific has a direct responsibility, there are many ice-engine-equipped foreign cars and those owned by the Pullman Company which pass over their lines and are fueled by them.

The propane containers used are designated as ICC-4B-300 galvanized cylinders. Each cylinder is equipped with a shut-off valve, pressure relief valve, and excess flow check valve, as well as the special bent tube inside of the cylinder which prevents the eduction of gas in liquefied form. (Caution to all propane suppliers; conventional propane cylinders such as are used for domestic and commercial propane installations cannot be used in railroad service because of the angle at which the cylinders are installed beneath the coaches and the danger of liquid eduction without special construction features which are included in railroad propane cylinders.)

The cylinders, as will be noted from accompanying illustrations, are carried in fuel cabinets in groups of 2, 3, or 4, depending upon the number of engines on the car. Special pressure regulators are built into the cabinets.

Propane is purchased from the Standard Oil Co. of California, Wasatch Oil Refining Co., of Utah, and Gas Products, Inc., of El Paso, Texas. Cylinders are trucked to the filling stations of the suppliers, who fill, test, and repair them for the railroad, and also make the quinquennial tests as required.

Most refueling is done at the Los Angeles and Oakland terminals, but

stocks are also maintained at San Francisco, Sacramento, Portland, Klamath Falls, San Diego, Sparks, Ogden, Tucson, Phoenix, El Paso, and Tucumcari.

Have Propane-Fueled Ice Engines Proved Satisfactory? Perhaps this question may be best answered by the words "propane-fueled engines have met our requirements very satisfactorily," from Mr. Brown's letter; and also a statement that similar equipment is specified for passenger-carrying cars that the Southern Pacific now has on order. Needless to say, with an experience dating back to 1936, the Southern Pacific lines would not continue placing orders for propane-fueled ice engines if they had not been entirely satisfactory!

What Gas Load Is Available? We know that every passenger coach which operates on branch lines to America's thousands of Frog Hollows and Possum Creeks is not going to be equipped with an ice engine because the economics involved would not permit it. Much of the rolling stock on such lines is antiquated and slated for the junk pile as soon as it has delivered its ultimate usefulness.

On the other hand, American railroads have not been able to buy new rolling stock for the past 5 years, and replacements are becoming imperative. Fully 90% of the new passenger coaches being built are specified for some type of air conditioning, and the demand for propane for this purpose from American railroads is bound to increase with the typical astronomical progression which has characterized the use of B-P Gases in other fields of application.

The Southern Pacific lines already use 60,000 cylinders per year. Multiply this by 100 and you have 6,000,000 pounds per year that this one railroad uses!

What about the other railroads already using propane-fueled ice engines? Accurate figures are not immediately available, but I do not think that I am too visionary in prophesying that the railroads will be one of our best customers in the not-too-far distant future with a demand upon us in excess of two billion pounds of the B-P Gases per year for air conditioning, alone.

In the first paragraph of this chapter, I referred to the use of present day "air conditioning" plants in American homes. I believe that American railroads are pointing the way to important improvements in such systems. Why not smaller editions of the ice engine to be incorporated in home "air conditioning" plants?

We have done this once in the field of domestic cookery, and there is no reason why we cannot do it again. We must never forget that the domestic cooking load has been the mother's milk which first gave us strength, and it will always continue to be an important factor in our economic strength, but when I consider such important commercial and industrial applications as this one of air conditioning to our American railroads, do you wonder that I become prophetic enough to state that today's accomplishments are as nothing compared with our commercial and industrial future?

Florida Ship Builders Swing To Tanks

By Joseph Lawren

A BOTTLE smashed on steel June 21 in the first peacetime christening ceremonies at the Merrill-Stevens Drydock and Repair Co., of Jacksonville, Fla.

Christening ceremonies are routine to veteran shipbuilder officials of the company, but this ceremony was different. The bottle broken by Mayor C. Frank Whitehead was not champagne, but sparkling water. The steel over which it bubbled was not a victory ship, but a 250-gallon tank for butane or propane gas, the first off the production line at the Jacksonville plant which announced a new division devoted to the manufacture of domestic tanks for liquefied petroleum gas.

Set up to turn out 30 tanks a day at present, the new department of

Christening the first tank to come off the production line at Jacksonville for Southern Gas & Equipment Co. Left to right: Mayor C. Frank Whitehead; J. C. Merrill, Sr., president of Merrill-Stevens; Lorraine McCranie, Matron of Honor.

Testing 250-gal. systems at Jacksonville, Fla., at building plant prior to loading on steamers.

Merrill-Stevens will be under direction of Benson Drake, production manager and former mechanical superintendent of St. John's shipyard, who said 50 tanks a day will be produced when the department gets in full swing. More than 250 tanks are now nearing completion and are in the process of being tested for 220 pounds pressure.

The tanks are being manufactured for the Southern Gas & Equipment Co., Tulsa Okla., and will be marketed throughout the southeast. Jacksonville is the fourth city of the nation to undertake their manufacture, according to Chal Skinner, branch manager of the Southeastern division, who is supervising production at present. Mr. Skinner said sufficient orders are already on hand from customers in this area to take care of all tanks which Merrill-Stevens can produce in the next six months.

Mrs. Brahna Hutchins Elected President of Safety Research

Brahna Chalefman Hutchins has been elected president of Safety Research Institute, Inc., educational and public relations organization in various types of safety work. She was formerly a vice-president.

Other officers elected at the same time are Frank Arnoldi, vice-president, Robert Nathans, vice-president, and Angela B. Daniels, secretary and treasurer. Mr. Arnoldi was re-elected and Miss Daniels was formerly secretary of the organization. Mr. Nathans did not hold office previously.

Mrs. Hutchins joined Safety Research Institute in 1940 after serving as assistant director of the National Consumer-Retailer Council for two years. She is the widow of the late Leroy W. Hutchins, former president and treasurer of the organization.

Thousands of housewives are waiting to buy new, modern gas ranges. They have the desire, and the means, to buy the *best*. Our consumer advertising program is telling these women that ranges equipped with the Harper Center Simmer Burner are definitely superior... that the Harper "2 burners in 1" top burner saves up to 39% on gas, keeps kitchens up to 9 degrees cooler, saves hours of kitchen pot-watching weekly, and makes possible many other advantages symbolized by the Harper seal.

You can *demonstrate* these advantages to your customers. There is no surer way to close sales on higher-priced ranges... to augment the position of gas as the ideal cooking fuel through promoting appliance improvements that give better cooking results. Scores of helpful pointers on how to demonstrate effectively are contained in our booklet "How to Sell More Gas Ranges." Copies are available for your staff—FREE. Simply address: Harper-Wyman Company, 8562 Vincennes Avenue, Chicago 20, Illinois.

No Goal Better Than Safety, Colorado Dealers Told

COLORADO dealers have proven themselves earnest and energetic—even idealistic—in the formation of their association and campaign for safe practices in handling their product, but that doesn't mean they haven't the capacity to play—at opportune times.

The June 24 meeting of the Colorado Liquefied Petroleum Gas Association afforded an occasion for combining work and pleasure in a happy blend. For Gunnison—where they met—is in the heart of the Rockies; the streams run clear and cold, and the trout strike hard!

Recreation preceded the meeting, however, as a full program had been arranged for the 115 conventionites by George T. Cummings, Cummings Gas & Appliance Co., vice president of the organization and resident of Gunnison, who also acted as toastmaster at the noonday luncheon.

The first speaker was Charles M. Corken, Oklahoma City, who discussed bulk plant and transport pump operations. He stressed the importance of bottom outlets, proper side lines from storage to pump, and using at least a ¾-inch vapor return line. (See Page 33 for details of talk.)

T. H. Anderson, association secretary-treasurer and manager of the Denver Skelgas Co., presented a brief for bottled gas distribution, particularly citing its place in Colorado's industry development.

HARRY TORBIT

G. T. CUMMINGS

President Harry Torbit, who has so successfully directed the progress of the association since its organization, delivered the key address in which he stated that, "the future of the LP-Gas industry in Colorado depends entirely upon the dealers, themselves, and that it will be most bright if we will install approved equipment, make safe and sound installations, and service our customers sincerely and intelligently." He stated further that if the industry failed, "it would be from causes within our own dealer set-up and not from outside forces." He warned dealers to not let the present sellers' market stampede them into making faulty installations which, later, would hurt the reputation of the industry.

Mr. Torbit paid special tribute to the splendid cooperation Colo-

rado dealers are receiving from State officials, who have been found to be generously willing to work with the dealers in the interest of public safety. Special credit was given to Roy Mac Ginnis, State inspector of oil.

Other talks were made by Ed G. Colglazier, assistant fire chief of Pueblo, on safety; Dr. G. L. Nuckolls, luncheon speaker; and John Kirkpatrick, Huerfano Trading Co., Walsenburg, on the importance of keeping records to determine profits. Gunnison's mayor, William Endner, made the address of welcome, to which reply was made by E. L. Scott, of Butane-Propane Service, Holyoke, and second vice president of the association.

The last hour was devoted to a hearing on State rules and regulations, conducted by Roy Mac Ginnis, who administers the Colorado gas act under which butane-propane dealers operate.

The election of new association officers and directors will occur at the annual meeting, scheduled for Denver on Oct. 14.

M. W. Kibre Named President By CNGA Directors

The California Natural Gasoline Association's president for the 1946-47 term is M. W. Kibre, assistant manager of General Petroleum's gas department. "Jim," as Mr. Kibre is known throughout the industry, started his industrial career with the Celite Corp. as a chemist in 1927, shortly after graduating from the University of California with a B.A. degree in chemistry.

Mr. Kibre has been actively associated with the technical work of CNGA since 1929. Last year he served as vice president of the Association and chairman of the Advisory committee.

M. W. KIBRE

F. G. COLTON

CNGA's vice president for the 1946-47 term is Frank J. Colton, superintendent of gas operations for the Tide Water Associated Oil Co. Mr. Colton is a Native Son, having been born in Bakersfield, Calif.

Upon completion of his scholastic training in 1920, he entered the engineering department of the Associated Oil Co., and continued in engineering work until transferred to the gas department in 1926 and became head of the gas department in May of that year.

Five new directors are Coles B. Bason, H. L. Eggleston, C. L. Hutchings, R. C. Patterson, and George F. Howells.

George L. Tyler was reappointed secretary-treasurer and is now serving his ninth year in that capacity.

The Annual Fall Meeting of the Association is scheduled for Oct. 11 at the Ambassador hotel, Los Angeles. General chairman of the event is E. G. Ragatz, Bectel Bros. & McCone Co.

50 Men from Missouri

THESE 50 people devote their full time to engineering projects aimed at making Weatherhead products *better*—for *less*. They have "to be shown" by scientific tests just how good a product really is. And then, they often reverse the situation and show *us* how we can *improve* the products you use.

Our testing laboratories are equipped to reproduce every condition under which Weatherhead products may be used. For example—

(1) A tensile strength testing device gives brake hose a 1000 pound pull. (2) Tube fittings are subjected to 1800 vibrations a minute. (3) Hot salt is sprayed on valves and fittings to test the finish.

And there are scores of other scientific tests which help our "50 men from Missouri" determine what can be done to give you *better* Weatherhead products at *lower* cost.

It's this kind of extensive testing, plus modern methods of product development, design, and manufacturing, which is making *"Look Ahead With Weatherhead"* more than a slogan!

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Corrosion
Of Hot Water Storage Heaters

By CHRIS GOLDKAMP

Corrosion Engineer, San Diego Gas & Electric Company

THE CORROSION of hot water storage heaters is one of the most serious problems in customer relations. San Diego, Calif., has more than its fair share of water heater failures, and it was only natural for the author to make an investigation into the problem. In this article, Mr. Goldkamp outlines some of the causes of water heater corrosion and failure.—Editor.

IN no place where metal is employed for domestic use is its wastage so large and extravagant as that caused by the failure of hot water storage heaters.

That these failures are largely due to corrosion is evident from years of study on the part of investigators employed by power, gas, water, telephone, and street railway companies.

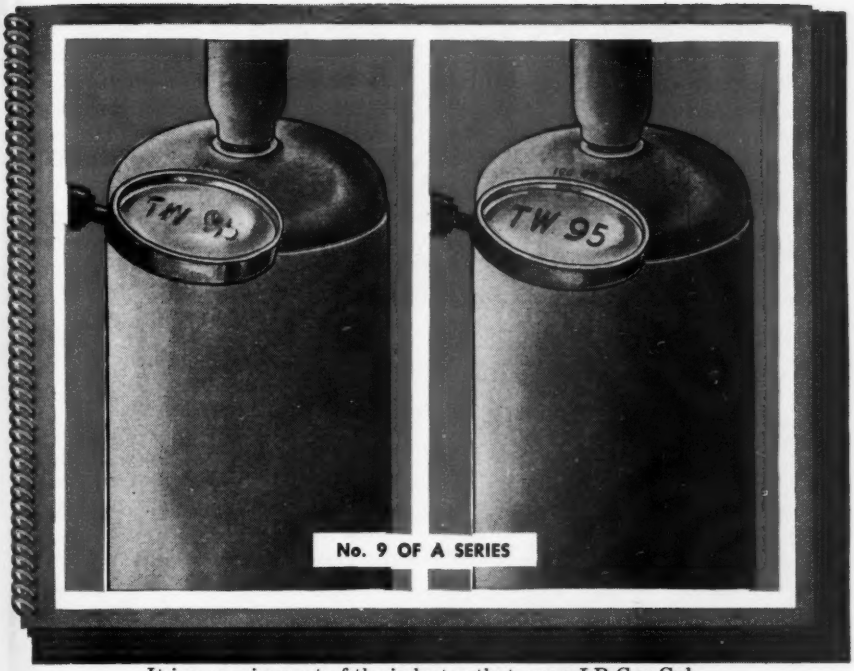
These investigations have been brought about by the fact that many plumbers, in attempting to explain to irate customers why a new water heater has lasted for only a few months, have frequently pointed to nearby trolley lines or transformers and said, "Leaking electricity is getting into the pipes and eating out your water tank!"

The plumbers were partly right. The water heater failures were due to an electrical process that was resulting in corrosion, but the source of electricity was seldom, if ever, a trolley or power line.

Because San Diego has had more than its fair share of water heater failures, it was only natural to assume that perhaps the local water was to blame. What other explanation could there be for the fact that the same quality heaters, made of the same materials and subjected to the same use in other parts of the country will often outlast San Diego heaters by months, and even years?

On the other hand, customers often pointed out that their old manually-operated heaters lasted for periods of from 20 to 30 years. This would lead one to believe that water alone wasn't at fault.

Many cities having hard water do not always have the same degree of water heater failures. Studies have shown that it is the extent to which mineral salts are present in quantities sufficient to make electrolysis and corrosion possible. Tests taken of the water at spigots located at the site of the heater failures have shown that the water contained a high degree of conductivity for electricity. Water containing sufficient quantities of mineral salts, in addition to dissolved oxygen and carbon dioxide gases,



It is a requirement of the industry that every LP-Gas Cylinder must be weighed when finished. The accurate tare-weight must then be marked on the head of the cylinder.

No hammer dents

Some manufacturers bang the tare-weight numbers on with hammers. Dents in the cylinder head are the natural result—dents and hard-to-read figures. Trageser puts these numbers on by a Trageser process that cuts clear, easy-to-read numbers in the cylinder head and makes no hammer dents. This means that the markings will be permanently legible, and assures safe filling.

Trageser's 14 advantages

1 Long experience.

2 I. C. C. and customer's markings clear and deep.

3 No hammer dents from marking tare weight.

4 Wearing rings plug welded for strength—Trageser original.

5 Substantial flanges, ample threads, self-draining.

6 Completely pickled.

7 Paint applied while cylinders are hot; dried under heat.

8 High-grade, rust-preventive base paint.

9 Completely dehydrated.

10 Weight controlled. No excess.

11 Rigid Trageser testing, more than I. C. C. compliance.

12 All sizes.

13 Special tank equipment made to specs and design.

14 All new equipment. Most modern plant in U. S. for L P-Gas cylinders.

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IT'S THE FIRM THAT MAKES THE CYLINDER THAT MAKES THE DIFFERENCE

is the most common cause of ferrous metal corrosion.

Tests made on soil by electrolysis engineers have shown a definite relationship to exist between the electrical resistance of the soil and the corrosivity of materials when placed in that soil. Similar tests have been made of the water in San Diego.

Chris Goldkamp, corrosion engineer for the San Diego Gas and Electric Co., holds two intake pipes, both of copper. In his right hand is a new copper pipe; in his left hand is a copper pipe which has been coated with zinc as a result of electrolysis in a water heater.

Although insufficient material has been gathered from which charts can be drawn, there seems to be a definite relationship between the electrical resistance of the water and the corrosivity of the iron water tank.

For example, the water in the southern part of San Diego comes from a different source than the water in the northern and eastern parts of the city. The water in the southern area has a resistance of from 1200 to 1400 ohm-centimeters. The water in the northern and eastern districts has a resistance of from 2500 to 3000 ohm-centimeters. In the latter named areas water heaters have been found to outlast those in the former named area by considerable lengths of time.

While the attention of the entire water heating industry and of the AGA laboratories has been devoted to obtaining an even greater efficiency out of water heaters and every bit of heat possible for every cubic foot of gas burned, little enough attention has been given to the use in heaters of those metals which will prevent or discourage corrosion.

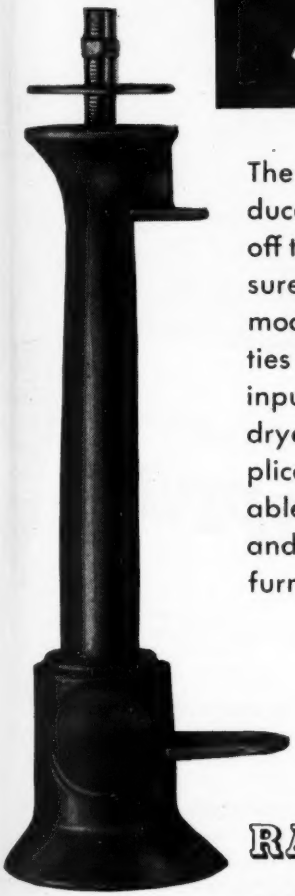
Main Causes of Corrosion

One of the main causes of corrosion has been due to galvanic couples. Galvanic couples are formed by the union of two metals whose position in the galvanic series is such that when immersed in the proper solution a current is created.

Table 1 shows a list of metals and their relative positions in the galvanic series. Those metals farthest apart will provide the most

HIGH PRESSURE

Spread Head



The burner illustrated was designed to produce a radial spreading fire immediately off the burner head, operating on high pressure gas of one pound and upward. This model is made in six sizes with input capacities from 50,000 to over two million BTU input. Recommended for dehydrators, grain dryers, Scotch marine boilers and other applications subject to extreme draft. Available with or without pilot, and with valves and automatic controls. Complete details furnished upon request.

◆

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TABLE 1. POSITION OF METALS IN THE GALVANIC SERIES

Corroded End (Anodic, or Least Noble)

Magnesium
Magnesium alloys

Zinc

Aluminum 2S

Cadmium

Aluminum 17ST

Steel or Iron
Cast Iron

Chromium-Iron (active)
Ni-Resist

18-8 Stainless (active)
18-8-3 Stainless (active)

Lead-tin solders
Lead
Tin

Nickel (active)
Inconel (active)

Brasses
Copper
Bronzes
Copper-nickel alloys
Monel
Silver solder

Nickel (passive)
Inconel (passive)

Chromium-iron (passive)
18-8 Stainless (passive)
18-8-3 Stainless (passive)

Silver
Graphite
Gold
Platinum

Protected End (Cathodic, or Most Noble)

ideal elements for corrosion. When elements farther apart on the scale are immersed in mineral salt solutions, a current is set up from the anodic, or least noble metals, to the cathodic, or most noble metals. The anodic metals lose their metals to the cathodic metals, and in doing so become corroded. The opposite is true in that the closer the elements are together in the galvanic series the less is the possibility that corrosion can exist.

Many heaters have an iron, zinc-coated tank. The intake pipe is of copper, to insure it outlasting the tank and thus prevent the possibility of water bypassing the heating area.

From the galvanic series chart it can be seen that when a zinc-coated tank is equipped with a copper intake pipe, two elements are used which are some distance apart on the scale. It is easy for the electrolysis to start.

The zinc wastes away and in some waters deposits itself on the copper, leaving the bare iron exposed to the water. The oxygen in the water attacks the iron, which soon corrodes and the damage to the tank is completed. Many tanks have been examined where the copper intake pipes have been coated with zinc.

This is frequently the case where the flues of a water heater are the first to go. The flue and the intake are always closer together than the other parts of the tank, and the action here is naturally easier and more rapid. This condition is also characteristic when brass intake pipes are used.

Insulation of Tank

In addition to intake pipes, it frequently happens that many houses have their hot water pipes

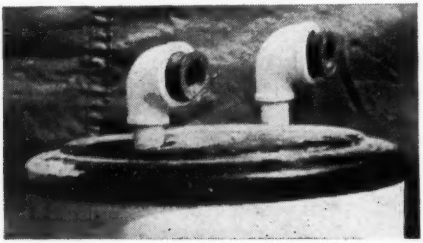
or even their entire water systems in copper piping. This means that the zinc-coated tank is then vulnerable to the entire household system. The more copper area which is exposed to the zinc, the faster the process and the more rapid the tank's disintegration.

Where such conditions have been found to exist, the water heater tanks are insulated with a Formica insulated bushing, or a flanged insulating joint. These are Bakelite composition bushings which can be inserted into a regular pipe fitting. They are both water-resistant and insulators of electricity. By their use, the connection between the metals is broken, the galvanic couple is interrupted, and the current is reduced to a minimum.

The loss of metal by corrosion in these heaters is insignificant. But only one small hole in the tank will disable an entire heater with its remaining good metal, thus creating an extravagant waste.

Imperfect Coating

Despite the best precautions on the part of the manufacturer, many tanks are not perfectly zinc-coated. Due to the fact that a small bit of lead will sometimes be found on the surface of the liquid in the zinc-galvanizing tanks into which the heaters are immersed, the first zinc coating on top of an iron water heater is quite apt to be composed of a lead-iron-zinc alloy. The final outside coating is nearly pure zinc. Sometimes there are small breaks in the coating, thus leaving a "holiday" on a small bit of iron exposed.



View of the Formica bushing in place in the elbows before the intake and outlet pipes are put in position.

Corrosion of Zinc

As it can be seen from the galvanic series chart (Table 1), the zinc and the iron are sufficiently far apart to start a galvanic action which results in the corrosion of the zinc. The current flows from the zinc or anode into the iron or cathode. The zinc breaks down, and the lead is left exposed.

In the meantime, a tubercle is formed over the entire holiday, which completely seals off the area from the rest of the water heater. The action within this tubercle is then entirely independent of the rest of the tank.

As it can be seen from the chart, the lead is even further down the scale than the iron. This means that the process is reversed, the current flowing from the iron, which has become the anode, to the lead, which has become the cathode. The result is an even more rapid electrolytical process and corrosion.

Accelerating Factors

The fact that the old manually-operated water heaters outlasted the automatic type gave reason to believe that higher temperatures had something to do with the process. It has been found that where the water has been main-

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3. **LOW OPERATING COST. Costs but pennies per hour to operate**
4. **LOW MAINTENANCE COST. Sturdy stainless steel construction, with aluminized steel structural members. Completely protected against rust and corrosion.**
5. **COMPACTNESS. Unit with 360 slices per hour capacity requires only 18⅝" by 16⅝" counter space, 720 slice unit only 23⅛" by 16⅝".**
6. **FITS ALL NEEDS. Gas operated models for toasting bread, buns and sandwiches.**

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tained at 180° F., the corrosive action is twice as rapid as that where the water is maintained at only 140°F. The combination of higher temperature plus an undersized heater affords a splendid condition for corrosion.

The most recent example found in San Diego was a case in which two water heaters had been placed in an apartment. Both heaters were of the same make and type. A large family moved into one of the units; the heater was naturally too small to serve the needs of so large a family. There was seldom sufficient hot water. The thermostat was turned up as high as it would go. The water heater lasted only a short while. The heater in the second unit served an elderly couple who used hot water only occasionally at a thermostatic setting of 140°F. That heater is still in working condition today. It often happens that when heaters are too small to serve the family, the thermostats are turned to their highest points and the electrolytical process is accelerated.

Water pressure is also an accelerated factor. Aside from the fact that water at high pressure will often "blow" the weakened structures out sooner than they otherwise would have given way, the high pressure water will cause more turbulence within the tank.

The turbulence of the water increases diffusion of oxygen naturally dissolved in the water to the surface of the metal, which automatically creates a condition more favorable to corrosion. If there are a great many elbows, bushings and fittings in the piping, especially adjacent to the tank, the water at its higher pressures and velocity will create even greater turbulence, thereby increasing diffusion of dissolved oxygen from the water to the inner surface of the piping and tank.

Preventative Measures

Two ways to prevent this condition have been employed. The first, of course, is to decrease the pressure of the water at the entrance to the house; the second method is to encourage new home builders to provide piping that is as straight as possible, containing few bends and fittings.

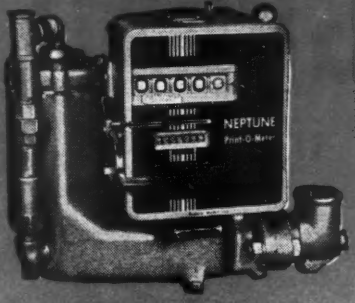
As blood corpuscles in the body rush to heal a break in the skin, as the sap in the tree rushes to heal a cut in the wood, metal also reacts to the effects of oxygen by forming a protective scale. This scale naturally covers all the metal surface and will retard the corrosive process. High water pressures and air hammers within pipes will break and crack this protective scale, thus encouraging corrosion.

Although water heater manufacturers warn the user to drain the heater regularly, many fail to take this precaution. It is only reasonable that the residue composed of foreign matter deposited on the bottom of the tank will also contain among other things mineral salts, thus adding to the conductivity of the water. This, of course, means that corrosion is accelerated.

Corrosion Due to Sludge

The sludge that is deposited in the bottom of a tank will often create new chemical constituents

SILENT PARTNER

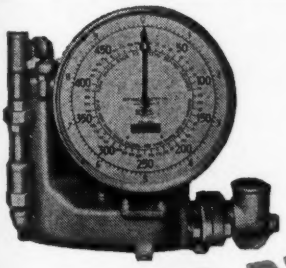


WITH A HEAD FOR BUSINESS

Here is a real profit-protecting partner for you. It is a faithful worker that quietly and dependably registers all LP-Gas gallonage handled, whether withdrawn from bulk storage or delivered to customers from dispensing units or tank trucks. It is the Neptune Red Seal LP-Gas Meter—the meter whose record for sustained accuracy is unsurpassed.

By accounting for every gallon of LP-Gas, this silent partner enables you to speed up truck loading and delivery operations, to eliminate overmeasure, to find leaks faster, to reduce handling effort. And when your Neptune LP-Gas Meters are equipped with the Print-O-Meter Register, the receipt tickets give customers indisputable printed proof of full-measure deliveries.

Get all the facts about Neptune Red Seal LP-Gas Meters and how they can figure in boosting your profits. Ask for Bulletin 779. Write today.



Neptune Red Seal Meters accurately measure LP-Gas. Long-life measuring chamber has only *one* moving part—the piston. 1¼-Inch "Compact Type" 1D Meter, shown at left, is equipped with easy-to-read Round Dial Register. Other register types available.

NEPTUNE RED SEAL METERS

NEPTUNE METER COMPANY
50 West 50th Street • New York 20, N. Y.
Branches: Atlanta, Boston, Chicago, Dallas, Denver, Kansas City, Mo., Los Angeles, Louisville, Philadelphia, Portland, Ore., San Francisco and Long Branch, Ontario.

A 163

which may frequently add to the possibility of corrosive action at the interface of the sludge and water. One would assume from the foregoing paragraphs that most heater failures would be near the top of the tank, due to higher temperatures. But, due to the fact that it often happens that corrosive action will take place very close to the interface of the sludge and the water line, an action is indicated between the sludge and the tank.

Stray Currents

Stray currents sometimes find their way into heaters to add to the corrosion. These currents may originate from nearby trolley lines or from grounded currents that will seemingly come from nowhere, enter the pipes of a house, pass through the water system and water tank, and out of the house again. Sometimes these currents have been traced for hundreds of feet. Some of these currents are restricted in their flow.

Frequently the compound used in making threaded pipe connections hardens with age and, regardless of how tight the union of the pipes may seem to be, the hardened compound will form a high-resistance joint, causing a drop in voltage across the joint. The stray currents coming through the pipes of the house will be restricted in their flow and corrosion will form in these joints.

Other currents originate from "long-line currents," which are

Close-up of a Formica insulated bushing. The bushing is inserted between the elbows and the intake or outlet pipe.

caused by the varying conditions of the soil through which pipes run. The chemical contents of these soils will differ to such an extent that the electric currents will be set up in the pipes and will flow into the house.

The water-softening processes frequently employed will often prevent corrosive action from taking place throughout any of the water systems of homes. This is not true in all cases, since in water-softening processes sometimes not all salts are removed (depending upon the type of water found) and the elements permitting corrosion will still exist.

Commercial establishments such as hotels, apartment houses, and restaurants find it to their advantage to install water treatment cartridges filled with sodium silicate or other chemicals to neutralize the detrimental mineral salt content of the water. This in turn reduces the chief cause of corrosion in water heating.

One of the most practical answers from a strictly technical point of view to the problem is the use of monel, copper, or other suitable non-ferrous metal for tanks and piping. Also, there is considerable promise of protective value in coatings of vitreous enamel and plastics.

Summary

The prevention of corrosion will follow an understanding of the problems by the water heater manufacturer, architects, designers, builders, and plumbers.

It also calls for the cooperation of civic officials, water authorities, power, gas, railway, and telephone company experts in controlling the contributory factors to internal corrosion of water heaters and piping, such as reducing water pressures and encouraging installation of water treatment plants. Through mutual study of the results of research a better comprehension of the problems of corrosion will ensue.

We chlorinate water to protect our health, so why not chemically treat water to mitigate the corrosion of metals?

Louisiana Dealers Will Work With State Legislature

At the annual meeting of the Louisiana Liquefied Petroleum Gas Association, at which Quentin Jones was elected president, a legislative committee was selected for the purpose of drafting amendments to the existing LP-Gas Act which were thought to be needed.

QUENTON JONES

Based on the committee's work, an amendment has been drawn, approved at a general statewide dealer meeting, and submitted to the legislature, which will do two main things: 1st, give the Louisiana Liquefied Petroleum Gas Commission broader authority and supervision over all persons handling LP-Gas or any appliances, equipment and appurtenances; 2nd, bring in additional revenues to the State so as to provide adequately for more extensive operations of the Commission.

Owners Save Money By Digging Tank Holes

IN many cases the installation of an underground liquid-gas storage plant is facilitated if the owner has the necessary hole and trench dug in advance of delivery.

As an aid in this matter the installation department of Vapo Butane Co., San Antonio, Texas, has prepared a table showing the size of excavation required for several sizes of systems. Here it is:

Tank Capacity Gallons	Excavation Dimensions (Feet) Length	Width	Depth
150	7½	2½	4
220-231	7½	3	4½
250	8½	3	4½
307	7½	3½	5
500	12½	4	5
1000	20	4	5

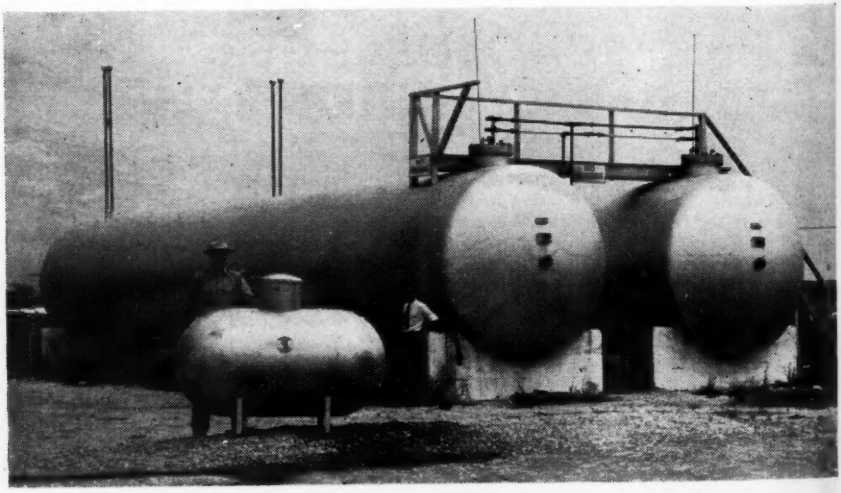
In deciding upon a location for the plant, the following requirements should be met:

1. Located at least 15 feet from the house or nearest out-building. (25 ft. for 500 gal.)

2. Select a location permitting easy access for the refueling truck.

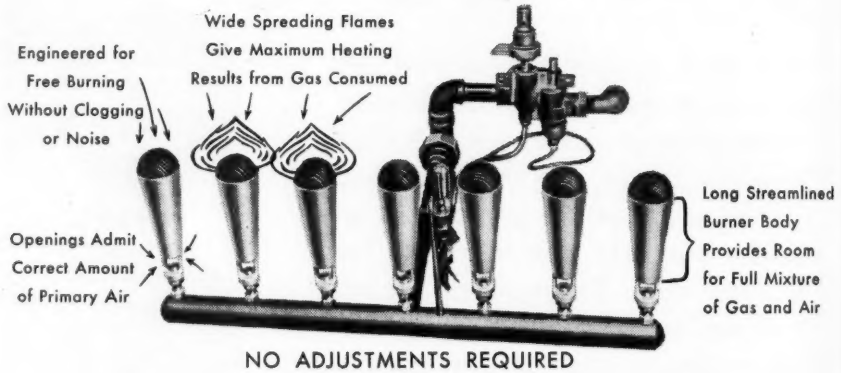
3. Provide, if possible, for an increasing grade from the tank to the house. The lowest point on the line from the tank to the house should be at the tank pit.

Finally, a trench for the service pipe to the house must be dug. This treuch should be two feet deep, and may connect with either end, but not the middle, of the tank pit. With these preliminaries completed the installers will do the rest.



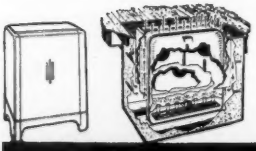
The Vapo Butane Co. has this 50,000-gal. butane-propane storage at its San Antonio, Texas, plant. In the foreground is Bill Huddleston beside a new type 300-gal. above-ground propane tank.

NO OTHER GAS BURNER EXCELS THE HEATING PERFORMANCE OF THE NEW *Empire*

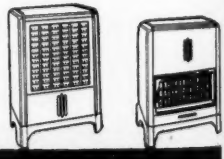


NO ADJUSTMENTS REQUIRED

Each burner is adapted for the kind of gas specified and is factory-tested before shipping... A short time ago gasmen dreamed of a burner embodying the features found in the Empire... Expert engineering and designing by the Empire staff has fulfilled this dream.



This burner is used exclusively by Empire, in our Gas Floor Furnaces, Gas Circulator Heaters, Gas Forced Air Circulator Heaters and Gas Closet-Type Units.



Empire Stove Company

BELLEVILLE, ILLINOIS

MANUFACTURERS OF GAS HEATING AND COOKING APPLIANCES

High Cost Manufactured Gas Turns Utilities to Propane

By F. T. CARPENTER and F. H. ANDREWS*
United Petroleum Gas Co., Minneapolis and Chicago

DURING the past few war years there was considerable demand by the manufactured gas industry for supplemental gas production facilities due to the increased load factor. In some instances it was not possible to install additional facilities due to space or other limitations, and in others where it was possible, purification facilities were inadequate to handle the additional volumes.

A readily available method to provide such additional production was the use of liquefied petroleum gas for (1) peak shaving, (2) cold addition, (3) cold enrichment, or (4) replacement of existing facilities. War demand for other higher priority operations restricted the widespread use of this flexible fuel; thus, it was not possible for utilities to take advantage of the comparatively low production cost per dollar investment available with liquefied petroleum gas operation.

Since the end of the war and the lifting of restrictions, the picture has changed considerably. The economic advantage of liquefied petroleum gas, proved by many years of gas plant operation in all sections

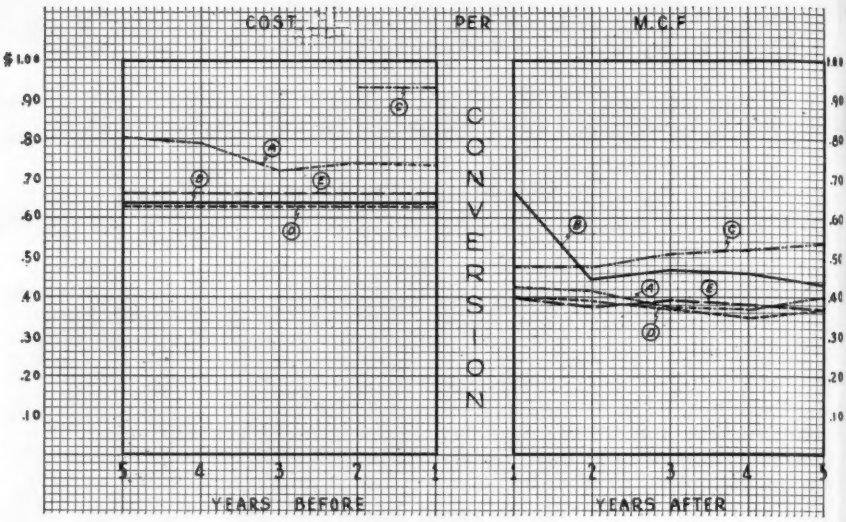
F. T. CARPENTER

F. H. ANDREWS

of the country, plus an accelerated increase in cost of fuel, oil, and labor in carburetted water gas and coal gas production, has given impetus to a long suppressed desire.

Interest in small town gas plant conversion and other production uses involving liquefied petroleum gas are at the highest peak in the history of the liquefied petroleum gas industry, which is comparatively young with respect to the manufactured gas industry. There are many reasons for the acceptance which liquefied petroleum gas has earned in the utility field, among which are low investment, low production cost, cleanliness of the finished gas, uniform combustion characteristics, and completely automatic operation resulting in a

* A paper delivered before the spring meeting of the Midwest Gas Association in St. Paul.



Conversion Chart 1

diversion of plant and service labor to sales, with attendant increased profit and good will.

Natural gas companies have also found propane for standby and peak shaving of immense value in their operations. Through ability to supply replacement propane-air gas in volume during stress periods, without the necessity of customer appliance conversion, such companies have obtained lucrative loads with slight increase in overall costs.

Those companies which contemplate conversion to natural gas from manufactured gas in the next few years should study the economics of changing to propone-air gas now, since through substitution of the proper Btu gas now, no further conversion will be necessary with the advent of natural gas. The propane system can then act as a very satisfactory stand by to natural gas, and probably be the means of reducing demand charges. Several major utilities who have experienced critical natural gas pipe line breaks in the past, have been exceedingly thankful for their liquefied petroleum gas standby, and have usually installed additional capacity after each such experience, appreciating the full value of this investment.

In view of the present day effort by utilities to halt the increasing cost of manufactured gas production, we believe that you men who represent management, engineering, and sales, are interested in factual cost data on the operation of small town gas plants using liquefied petroleum gas. This paper, therefore, will deal essentially with

QUESTION:

Is there a single drum regulator with adequate capacity for all domestic and normal commercial loads?

ANSWER:

Yes—it's the new design alloy metal die cast body Fisher Type 922.

FISHER TYPE 922

● This LPG Regulator provides extremely accurate and dependable pressure regulation. It is fully tested for all domestic and normal commercial loads. Has alloy metal die cast body and diaphragm casing to assure adequate strength, pressure tightness and neat appearance All operating parts readily accessible for inspection or replacement

SPECIFICATIONS

CAPACITY—Rated capacity 100 cu. ft. per hour.

SETTING—11" water column at 30 cu. ft. per hour 100 lbs. inlet.

RELIEF VALVE—Integral type, set and sealed for 1 lb.

INLET CONNECTION—970 POL, ¼" inverted flared tubing connection, ¼" pipe thread or ⅜" pipe thread.

OUTLET CONNECTION—⅜" and ½" IPT.

FISHER GOVERNOR COMPANY

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operating costs rather than the mechanical features of a plant converted to liquefied petroleum gas.

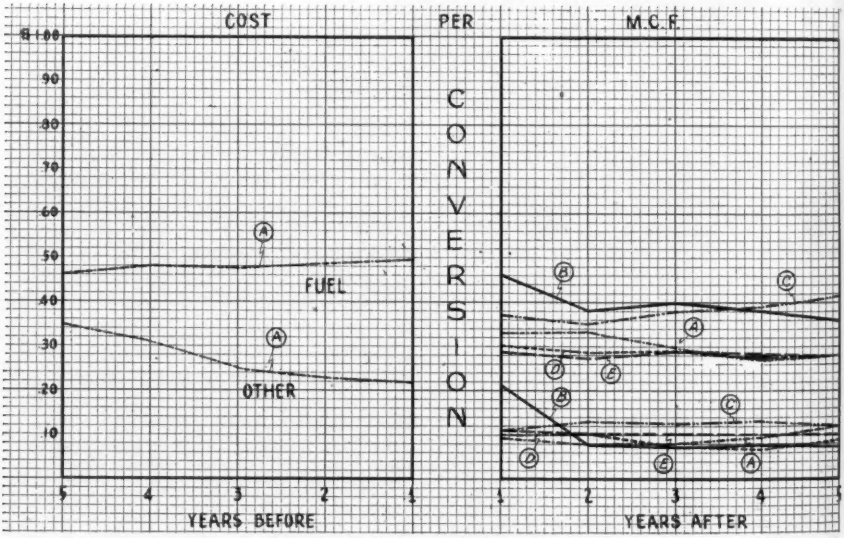
Through the courtesy of several Midwestern utilities, we have been able to obtain from their records the data necessary to produce the accompanying curves, showing actual production costs of various size plants. In order to make a true comparison of costs, we have reduced all Btu values to 525 per cubic foot even though operation is carried on at from 520 to over 800. All plants in the study have been in operation more than five years.

Plant A. This plant represented by Curve A, Chart No. 1 was converted from 525 Btu water gas to 525 butane-air several years ago. Main distribution pressure is 2¾ psi but all gas is compressed to 25 psi in high pressure holders before distribution. The main system is 100% steel pipe.

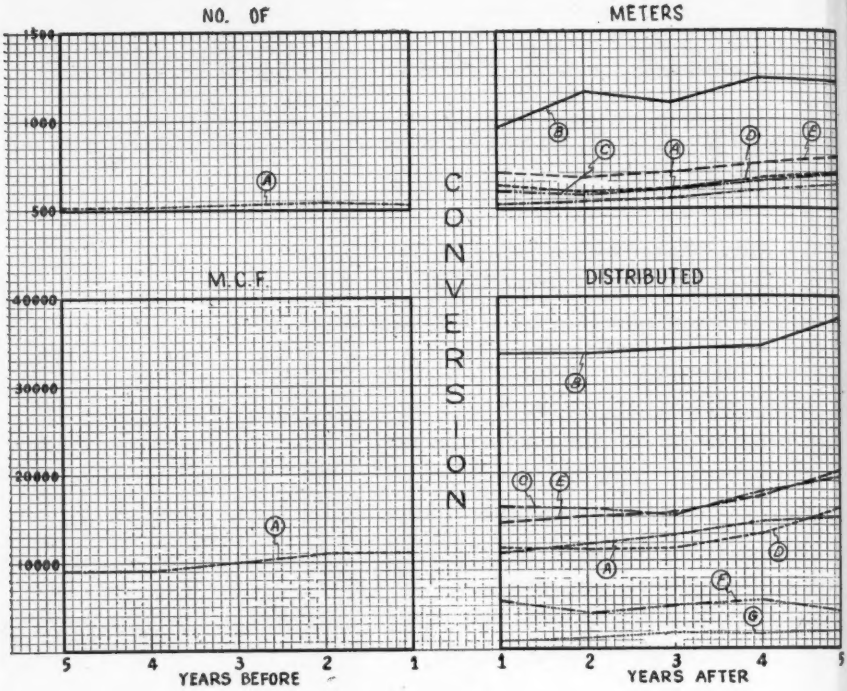
Plant B. This plant, represented by Curve B, Chart No. 1, was converted from coal gas of 520 Btu to 833 Btu propane-air. The main system is 61% cast iron and 39% steel. Distribution pressure is at 4½" water, but auxiliary HP storage is provided at 25 psi.

Plant C. This plant, represented by Curve C, Chart No. 1, was converted from 530 Btu water gas to 530 Btu propane-air. For the last three years, 100% propane has been used, but the first two years, 50% propane and 50% butane were used. Gas distribution is at 5-5½" water column with gas stored at 50 psi. Main system is 100% steel pipe.

Plant D. This plant, represented by Curve D, Chart No. 1, has 100% steel mains. It was converted from 540 Btu water gas to 540 Btu propane-air.



Conversion Chart 2



Conversion Chart 3

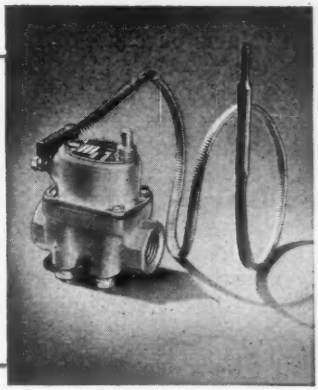
Distribution pressure is at 5 psi with HP gas storage at 60 psi.

Plant E. This plant, represented by Curve E, Chart No. 1, operates identically as Plant D with the same distribution pressure and Btu value.

It will be noted in these total production cost curves (Chart I) that water gas costs ranged from \$0.62 per MCF to \$0.94 per MCF while propane-air costs ranged from \$0.37 to \$0.52 per MCF. The chief difference in cost between the liquefied petroleum gas plants is represented by the cost of fuel as will be shown in the curve in Chart II. The cost for the first year for Plant B is due to accounting methods which have been subsequently corrected the last four years.

In Chart II we have shown the breakdown of fuel and other production costs. It is clearly seen that all plants had approximately the same labor (other) costs, at about the range of \$0.085 to \$0.115 per MCF. Fuel costs varied more, approximately from \$0.28 to \$0.42 per MCF. This is chiefly due to difference in freight charges on fuel from the source of supply which is normally based on Group III Oklahoma rates to these Midwestern

New MR-2 SAFETY THERMOVALVE



THIS new electro magnetic thermovalve assures unfailing safety in gas control applications. Used on space and unit heaters, central and floor furnaces, water and range heaters, hot water and steam boilers. Handles manufactured, natural or LP-Gases.

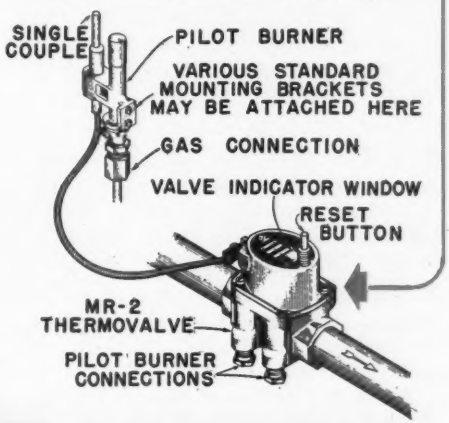
On the installation diagram, the new MR-2 valve and the new 26-R Pilot Burner are used for out-pilot safety control. No outside current is required. Valve holds open until released by pilot-flame failure. 100% gas shut-off will be maintained until pilot light is reignited and valve manually reset by push button.

For further information, contact your nearest factory branch or distributor, or write for Catalog 52-B and Manual FI-101.

Check these outstanding features:

- Streamlined design.
- High-flow capacities.
- Visual valve position indicator.
- Design simplicity.
- Sealed electro magnetic assembly.
- Heavy duty 5/16 round thermocouple.
- Flexible armored cable leads.

MR-2 INSTALLATION



GENERAL CONTROLS

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plants and also to some difference in volume purchase of fuel.

A breakdown in production cost was available only for Plant A, for the five years prior to conversion, and these data are represented by the two curves on the left hand side of Chart II. Note that while fuel costs are lower with liquefied petroleum gas, the greatest difference is in other cost.

In Chart III the number of meters and the MCF distributed is shown for all five plants after conversion and only for Plant A prior to conversion, as no previous figures were available for the other plants. A definite upward trend in both meters and MCF will be noted for all plants. The rate of increase is much more pronounced than for the years before conversion. While these were war years, at the same time load building was restricted and there was little attempt to push sales—so a true evaluation of customer acceptance can not be ascertained.

Composite Plant

In addition to the five plants A, B, C, D, and E, data for three other plants with similar operation, two of which had 100% steel mains, and one 60% cast iron and 40% steel, have been averaged to give a composite curve representing typical midwestern plant operation on both manufactured and liquefied petroleum gas (Chart No. 4).

Data for the past five years obtained for a plant having one 6′ and one 8′ carburetted water gas set have been converted into the upper Curve H on the "Composite Chart." In 1941 the total production cost of this latter plant was $0.433 per MCF and in 1945 this had increased to $0.5465 per MCF, or a 26.2% increase. We have assumed that a smaller plant would have had a cost of $0.55 per MCF in 1941 and applying the percentage increase shown for the larger plant, the 1945 cost would be $0.693 per MCF, assuming a proportionate increase.

Fuel costs for this plant increased as follows per MCF:

	1941	1945
Generator Fuel	$0.10838	$0.1313
Gas Oil	0.14222	0.1536
Boiler Fuel	0.0622	0.0784
	$0.3128	$0.3633

This makes 16.1% 1945 over 1941.

Assuming that a smaller plant with a 55c total cost in 1941 had a similar ratio of fuel to total cost, we would have the following cost per MCF:

	1941	1945
Fuel Cost	$0.398	$0.462
Other Charges	0.152	0.231
	$0.550	$0.693

A like study for the average of the eight liquefied petroleum gas plants gives the following costs per MCF: (See Curves I, Chart IV.)

	1941	1945
Fuel Cost	$0.343	$0.316
Labor and Other	0.122	0.115
Total Production Cost	$0.465	$0.431

The important facts to be derived from these data are (1) the constant low production cost of liquefied petroleum gas-air plants, and (2) the increasing cost of manufactured gas operation. In addition, a labor problem with liquefied petroleum gas-air does not exist, because of the automatic feat-

ARE YOUR L. P. G. PUMPING FACILITIES GEARED TO THE EXPANDING MARKET?

Late statistics on the L.P.G. industry give the following facts ... "The Liquefied Petroleum Gas Industry reached an all-time high in 1945 when it marketed more than one billion gallons of butane and propane. However, this new total represents only 10% of the potential market . . . 90% of the farm houses in the United States are yet to be sold this modern, low cost fuel . . ."

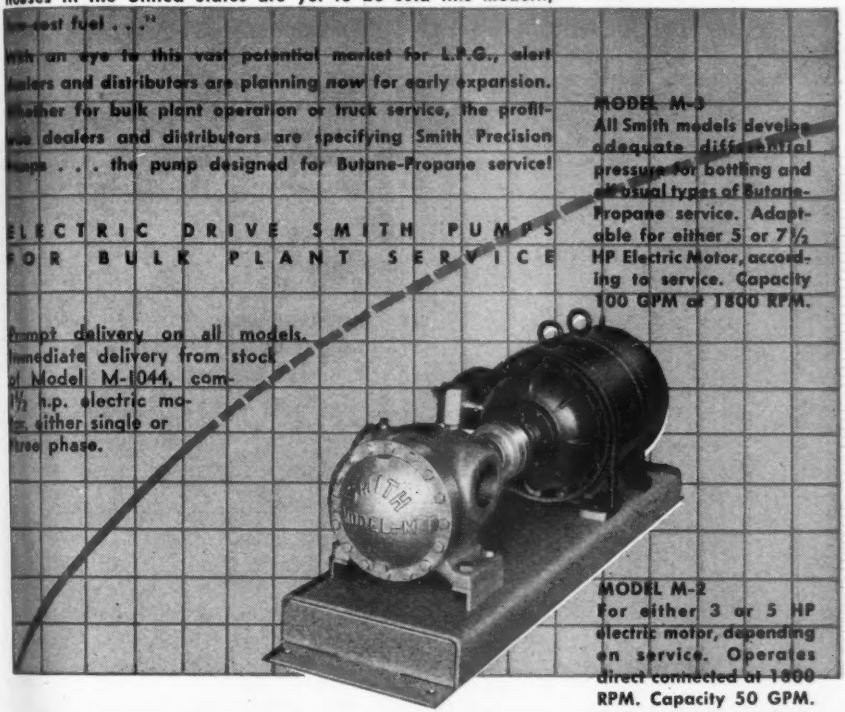
With an eye to this vast potential market for L.P.G., alert dealers and distributors are planning now for early expansion. Whether for bulk plant operation or truck service, the profit-wise dealers and distributors are specifying Smith Precision Pumps . . . the pump designed for Butane-Propane service!

ELECTRIC DRIVE SMITH PUMPS FOR BULK PLANT SERVICE

Prompt delivery on all models. Immediate delivery from stock of Model M-1044, complete with 1½ h.p. electric motor, either single or three phase.

MODEL M 1044
Direct connected to 1½ HP Electric Motor. Fluid sealed packing box prevents hazardous leaks. Capacity 20 GPM at 1800 RPM.

MODEL M-3
All Smith models develop adequate differential pressure for bottling and all usual types of Butane-Propane service. Adaptable for either 5 or 7½ HP Electric Motor, according to service. Capacity 100 GPM at 1800 RPM.



MODEL M-2
For either 3 or 5 HP electric motor, depending on service. Operates direct connected at 1800 RPM. Capacity 50 GPM. Built to Smith standards of accuracy and interchangeability.

Send today for your copy of the Smith Precision Pump Catalog No. K 646 and select the pump designed for your job.

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PRECISION PRODUCTS COMPANY

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ures of production. In one plant supplying 644 meters, a female bookkeeper acting as office manager and two male service employes represent the entire force. Only a few hours each month are required to unload propane cars and to check the plant equipment, and both service employes are available the major portion of their time for customer service and meter maintenance work.

It is not intended to state that liquefied petroleum gas plants are the ultimate in gas production facilities. Like any other gas system there are operating and distribution problems to overcome, but these by no means equal those found in manufactured gas production and distribution.

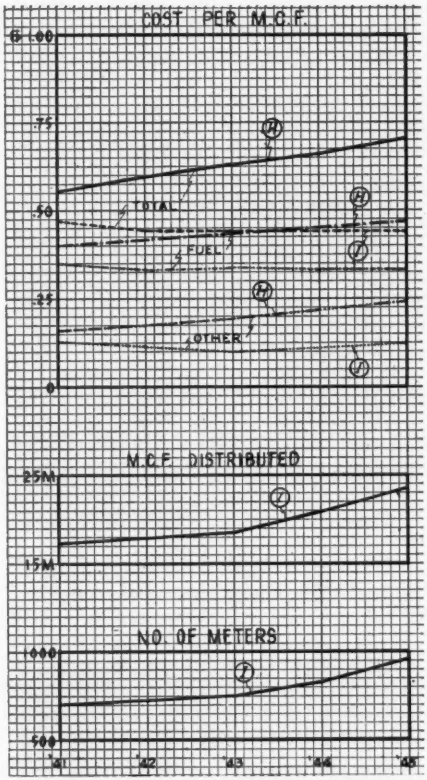
Let us analyze some of the questions which frequently arise regarding conversion to propane-air:

A. Propane and its mixtures are heavier than air, so isn't there more danger from explosion and fires when used by the average domestic user?

Experience indicates there is no increased danger due to this fact. The number of accidents has not increased over manufactured gas distribution from all records coming to our attention. A more forceful answer is the fact that there are an estimated 2,250,000 customers using undiluted propane or butane in the country today chiefly in the form of bottled gas. These customers use basically the same appliances as the manufactured and natural gas customers. Realizing that this industry is only 20 years old, customer acceptance must be considered remarkable — and this could not be achieved without safe operation.

B. Does not the use of a dry gas such as propane-air tend to dry out the mains causing dust troubles, regulator and meter replacement, and a high unaccounted for gas loss?

Dust troubles have been experienced by some companies after a year or two of operation. Regulators and pilots were affected. In one plant, oil fogging three years ago eliminated this condition and



Composite of conversion charts 1, 2 and 3.

since fogging there has been no repetition of this trouble. Another company reports after more than five years of service that it has changed some diaphragms on meters and regulators but a relatively small proportion and it sees no reason for any rapid change. This company also reported some difficulty with a fine, dark brown dust which gets in the regulators and services which have not been used for a long time—but the condition was not serious. No oil fogging has been done by this utility. Many companies previously contacted report approximately the same experience.

Records Were Incomplete

In the matter of unaccounted-for, which seems to be the most prevalent operation question, it was difficult to obtain data on manufactured gas distribution. In many plants there were no station meters on the old system, or records were not kept, or companies changed hands, so comparison of change in unaccounted-for cannot be made. However, experience after conversion has generally prompted a desire to keep such records.

Plant A shows the following percentages in unaccounted-for with propane-air gas: 1941—10.6%; 1942—11.3%; 1943—15.1%; 1944—11.3%; 1945—13.3%. Plant B shows following: 1941—15.5%; 1942—13.0%; 1943—14.5%; 1944—15.0%; 1945—11.9%. These results are fairly indicative, and it is presumed that similar percentage losses were obtained with water gas. Curves covering this unaccounted-for are shown in Chart 3 marked F and G.

In cast iron main systems, an increase in unaccounted-for has been noted in several instances but in each case the application of joint expansion material was introduced 10 years ago in a cast iron system and there has been no need for additional treatment since that time. The same holds true for a cast iron system treated four years ago. Therefore, such loses present no problem as the remedy is effective.

C. Is conversion of customer appliances difficult and costly?

Conversion cannot be accomplished without considerable expenditure. As one operator aptly remarked, there was plenty of trouble in converting a plant, but such troubles were nothing compared to operating a manufactured gas plant. This portion of total cost of a complete plant changeover may be from 30% to 40%. However, this is largely a matter of economics, as experienced conversion men are available for such work and the problem of conversion need not be difficult.

A survey of all gas appliances prior to conversion, the ordering of the necessary conversion and replacement equipment, and the final conversion after publicity requesting customer cooperation has proved an effective method in many instances. The value of the survey information to the sales department for future reference and contact is very tangible.

D. What about customer acceptance of propane-air gas?

A reference to the composite

PROTECTION for

REGO No. 2937

Automatic Cut-Off Valve

This valve has a capacity in excess of 30 cubic feet per hour, equal to about 90,000 B.T. U. per hour.

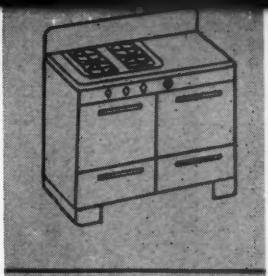
It operates only with normal gas pressure of 10" to 12" water column in the system. When gas pressure drops to 3" to 4" water column, the valve automatically closes.

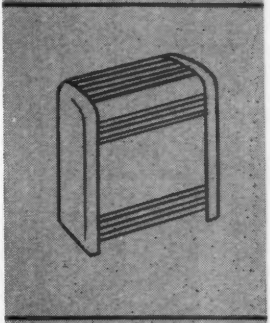
Inlet and outlet connections are 3/4" female taper pipe thread.

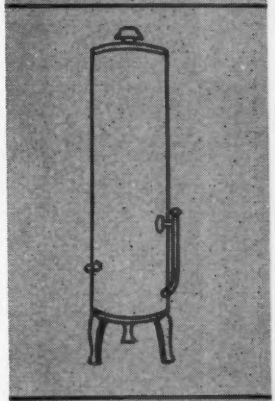
REGO LP GAS

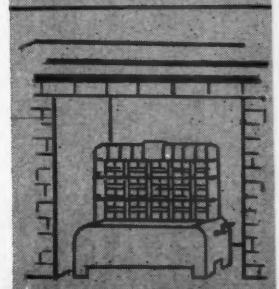
Pioneer and Leader in the Design and Manufacture of Prec

For GAS INSTALLATIONS WITH REGO AUTOMATIC CUT-OFF VALVES









Safe, sure, low-cost protection for the entire premises is assured by the installation of a RegO Automatic Cut-Off Valve at each LP Gas appliance.

Should the gas pressure from the source of supply drop below a safe point, *each* appliance protected by a RegO Cut-Off Valve will be shut off *automatically*.

To resume service, *each* valve which has closed must be reset manually, and service will not continue until the condition which caused the original stoppage has been corrected.

In addition, the RegO Cut-Off Valve functions as an excess flow check valve in the event that a connection is broken between the Cut-Off Valve and the appliance.

SPECIFY AND GET REGO PROTECTION FOR YOUR LP GAS CUSTOMERS WITH THIS REGO-DESIGNED, REGO-TESTED AND UNDERWRITERS' LABORATORIES-APPROVED AUTOMATIC CUT-OFF VALVE.

REGO
LP GAS EQUIPMENT

The **BASTIAN-BLESSING** Company

4201 W. Peterson Ave. Chicago 30, Illinois

Equipment For Using and Controlling LP Gases


Here are a few items which go to make up the complete line of high-quality SELWYN-LANDERS L.P.G. equipment.
We at the factory and our dealers are in a position to serve you with Rotary Gauges, Filler Valves, Vapor Return and Relief Valves, Slip Tube and Fixed Liquid Level Gauges, P.O.L. Pigtails and Adapters, Cylinder Valves, L.P.G. Regulators and many others.
We shall be pleased to quote on your requirements.
SELWYN-LANDERS CO.
4709 EAST WASHINGTON BLVD.
LOS ANGELES 22, CALIFORNIA
BETTER FITTINGS IMPROVE YOUR PRODUCT

curves quickly brings out the fact that customer acceptance is very good. After conversion many customers have asked why the utility did not change over long ago, because they appreciated the overhauling of their equipment and were happy with the way the new gas burned.

Perhaps the most important factor in favor of the liquefied petroleum gas-air plant is that it provides ability to render service to customers which the manufactured gas plant has no chance to equal. This point is of more importance than the difference in production cost. An automatic plant, turning out a gas having a constant Btu and burning characteristics, and free of gums and resins, from day to day, is certainly far superior to the erratic manufactured gas plant —all other factors being equal.

We should also look at the record to see what has happened thus far in the manufactured gas field. In the eight states comprising the Midwest Gas Association territory there are 72 manufactured gas plants, 36 of which have been converted to propane-air, butane-air, or undiluted propane. By the end of 1945, at least four additional plants will also be converted, bringing the total to 40 plants or 57%. Also, six other localities now have standby or peak shaving liquefied petroleum gas facilities.

All in all, we believe that present day interest indicates the complete acceptance by utilities for the liquefied petroleum gas-air plant for small towns. Companies who have several properties and have made comparisons on the operation and cost of both systems are proceeding with additional conversions as quickly as they can be fitted into their overall program. Liquefied petroleum gas plants have earned the right to be considered in the gas production field.

North Eastern Section to Meet With AGA and GAMA Oct. 10

Preliminary details have been completed for a one day meeting, with luncheon, of the North Eastern Section of LPGA, at the President hotel, Atlantic City, Thursday, Oct. 10, in conjunction with the AGA and GAMA convention and exhibits of the week of October 7.

Members of LPGA, who have requested tickets through the courtesy of GAMA, to attend their exhibits, may take advantage of this opportunity to attend both meetings.

During the week of October 7, Atlantic City will be extremely crowded. LPGA members should make their reservations directly with the President hotel at the earliest opportunity, identifying themselves with LPGA, states Howard D. White, executive vice president.

New Propane Company Will Operate in Ninety Six, S. C.

The Supreme Propane Gas Co., Ninety Six, S. C., was recently granted a charter.

The capital stock of the firm is $30,000.

Officers of the new company are Andrew B. McNeill, president; William A. Gardner, vice president; Mary L. McNeill, secretary and Lyda R. McNeill, treasurer.

CURRENT READING

• Reviews of new books, pamphlets and articles published in recent magazines of interest to technicians and executives in the liquefied petroleum gas industry. Those interested in reading any complete article or book should write to the publications named.

•

Simplified Methods for Calculating Stresses in Pressure Vessels—C. F. Boe. "Chemistry and Metallurgy," March, 1946, pp. 114-116. The most perplexing aspect of pressure vessel design is deciding which formula will give results that are neither too conservative nor too risky. There are two steps in making such a decision—comparing the various formulas, then picking the one which is best. However, designers are balked at the outset; the formulas are too complicated to permit comparison. The author has converted them to a common, comparable basis. Conservativeness is made a visible quality and the designer can pick and choose by sight.

Magnesium Gives High Cathodic Protection to Pipelines and Buried Structures—L. M. Oldt. "National Petroleum News," March 6, 1946, pp. R-186, 187. Magnesium—yesterday's wartime industrial metal—today is finding new uses in the petroleum industry. Underground pipelines and metal structures are being guarded against corrosion by expendable anodes buried in the nearby soil and employing the principle of cathodic protection. Greatly increased equipment life is predicted. For example, a flume built of steel piling driven 14 ft. into the earth was expected to withstand corrosion for only 5 years. Magnesium anodes installed for cathodic protection have extended that life expectancy for an indefinitely long period. Certain magnesium alloys, as described in this article, have been found to offer superior properties as galvanic anodes for this type of protection. When properly installed, as much as 500 ampere hours of electricity have been realized per pound of magnesium consumed at the anode, compared, for example, with 373 ampere hours for a zinc anode. Longer life, and efficiency of the magnesium anodes have been achieved by developing new types of backfill—the electrolyte used around the anode.

Chemicals from Light Hydrocarbons—J. E. Bludworth. "Petroleum Refiner," May, 1946, pp. 102-105. Presented is a general discussion of possibilities of manufacturer of chemicals from lighter hydrocarbons and particularly propane. It is pointed out that more is involved than translation of laboratory-learned possibilities into commercial production. Proposal to utilize excess propane in the manufacture of a chemical must be accompanied by consideration of market demand for that chemical, and effect of increased supply upon the price.

The Investment Value of Injection Gas—M. L. Arnold. "California Oil World," 2nd May issue, 1946, pp. 3, etc. While this paper contains data which is believed to be of general in-

terest, it is directed particularly to the men in the natural gas and gasoline divisions of the petroleum industry in the hope that it may arouse their more active interest in gas injection projects. For this reason, the discussion is developed as follows: First a brief statement of the necessity for and the objective of gas injection; second, a discussion of the results of an economic analysis of a hypothetical project, by methods which are applicable to any type of injection project; third, a discussion of methods for making greater quantities of gas available for injection. Some of these methods, if found to be economically feasible and placed in operation, would greatly enhance the prestige of the natural gas divisions within the petroleum industry.

Resistance Coefficients and Flow of Liquids in Pipe Systems—V. Tatarinov. "Product Engineering," May, 1946, pp. 406-411. Method for calculating size of pipe lines to obtain a specified flow of liquid. Resistance coefficients are given for discharge orifices, pipe enlargements and contractions, diaphragms and perforated plates, strainers and common fittings. Examples are included to show how the data are applied in the solution of flow problems in pipe systems.

Physical Constants of Paraffin Hydrocarbons. Natural Gasoline Association of America Standard 2145 (1945). "Petroleum Refiner," May, 1946, p. 130. Physical constants are given for methane, ethane, propane, isobutane, n-butane, isopentane, n-pentane, n-hexane, n-heptane, n-octane, n-nonane, and n-decane.

Cooling Water Treatment for Internal Combustion Engines. "Diesel Power," May, 1946, pp. 578-582. This article discusses use of chromate for conditioning internal combustion engine cooling water. The chromate required for various concentrations of salt is shown in charts.

Carbon Dioxide in a Natural Gas-Condensate System—F. H. Poettmann and D. L. Katz. "Industrial and Engineering Chemistry," May, 1946, pp. 530-534. Equilibrium constants for carbon dioxide in a natural gas-condensate system have been determined over the range 1 to 10 mole % carbon dioxide. Densities and molecular weights have been determined for saturated vapor and liquid phases for 24 hydrocarbon mixtures containing carbon dioxide at temperatures from 100° to 250°F. and pressures from 500 to 2900 lbs. per sq. in. absolute. It is shown that the lower the molecular weight of the hydrocarbon in the binary carbon dioxide systems, the greater will be the deviation of the carbon dioxide from ideal behavior. Equilibrium constants of carbon dioxide in the natural gas-condensate system deviate most from the ideal equilibrium constants. Since the multicomponent mixtures consisted of over 60 mole % methane, the methane-carbon dioxide system may be expected to show wide deviations from ideal solutions.

Installation and Maintenance of Internal Combustion Engine Valves, Seats and Guides—J. B. Creek. "Petroleum Engineer," May, 1946, pp. 238, etc. Suggested procedures based on data resulting from experience in field and shop, as well as on research.

Report on the Investigation of the Fire at the Liquefaction Storage, and Regasification Plant of the East Ohio Gas Co., Cleveland, Ohio, Oct. 20, 1944, by M. A. Elliott, C. W. Seibel, F. W. Brown, R. T. Artz and L. B. Berger, Bureau of Mines.

The Market Beyond the Mains For Gas Appliances and Equipment

By KENNETH W. RUGH*

Chemical Products Department, Phillips Petroleum Co., Bartlesville, Okla.

TO be sure that you have some of the background facts that lead men in the liquefied petroleum gas industry to certain conclusions with respect to our future market, let us briefly delve into the past 20 years of growth of our young industry. You can then better judge for yourself the firmness of its foundation, its organization, its market acceptability, its competitive strength and its future.

K. W. RUGH

Reports issued by the Bureau of Mines, Department of Commerce, indicate that 20 years ago there were but 5000 homes served with liquefied petroleum gas. During the next 10 years—1926 to 1936—the industry added 350,000 customers in spite of the fact it was new and unknown and was forced to develop in the middle of a depression.

The next five years, 1936 through 1941, represented a period of great activity. The liquefied petroleum gas distributors were building their organizations and developing plans for further expansion. New methods of distribution were being tried. The industry was beginning to study distribution costs, surveying for new areas, developing new equipment, making rate surveys, introducing promotional rates, instituting sound merchandising plans and analysing the best advertising and promotional approaches.

This period of growth culminated in 1941 when the industry installed 500,000 new customers. The industry was sufficiently potent to have sold and installed half again or maybe twice that number of customers providing the gas and the service had had the public acceptance which it enjoys today. The year 1941 was still a year when the idea of liquefied petroleum gas was new. It was still being initially introduced to a great part of its potential market.

However, the time was fast approaching when the original introduction was to play only a minor part in the activities of the distributor. Of a gross market of almost 20,000,000 homes, commercial and industrial establishments, resorts and institutions beyond the city mains, the indus-

* A paper delivered before the Gas Appliance Manufacturers' Association convention, Chicago, June 11-12.

Making fine Water Heaters

is the exclusive business of

UNITED STATES HEATER CO.

NOT JUST A DEPARTMENT--NOT JUST
A DIVISION--NOT JUST A BY-PRODUCT

United States Heater Company is a completely integrated manufacturing plant devoted exclusively to the development and manufacture of water heaters. All component parts are completely manufactured under one management and are designed specifically for use on United States Water Heaters. This undivided responsibility stands behind and guarantees the quality of every United States Water Heater.

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COMPTON, CALIF., U.S.A. REG. U.S. PAT. OFF.

Hot Water Heating satisfaction begins when the United States Heater is installed. This satisfaction reflects most favorably on the dealer who makes the installation . . . and builds for him a continuous profitable business that goes far beyond the original water heater sale.

UNITED STATES HEATER CO.

133 EAST PALMER AVENUE • COMPTON, CALIFORNIA

try had sold approximately 2,000,000 homes, 10% of the total. The liquefied petroleum gas industry is no different than another in that after you attain 10% of market saturation the original introduction is over and you have opened the gate to volume sales brought about through a more ready acceptance on the part of the consuming public.

At the first of 1942, war time restrictions were clamped upon the industry. This clamping down was like attempting to throw a dam across a reservoir during the flood season. The industry had come into its own. This was demonstrated by the terrific clamor on the part of both the distributor and the consuming public for relief from the war time restrictions.

This background of the industry has been outlined to describe how the liquefied petroleum gas industry developed on a sound basis. It also shows that the product and its method of distribution adequately fit the requirements of 20,000,000 homes beyond the city mains.

You want to know what the potential demand is for LP-Gas appliances. To avoid being classed as a prophet, let me recite a few figures and you draw your own conclusions. Four years elapsed during war time conditions when the expansion of the industry was practically at a stand-still. During that time the demand certainly was as great, if not greater, than existed in 1941 when 500,000 new users were installed. Four elapsed years, times 500,000 new users per year, is 2,000,000 users that would have been added during that period. Therefore, there must be two million homes today that do not have liquefied petroleum gas that would have had it had we sent a salesman to see them.

There must be two-thirds to three-fourths of the 20,000,000 homes beyond the city mains that economically are in a position to acquire the service. Add to that the large number of new homes that will be built by families desiring to live outside of the city. Don't o v e r l o o k the increasing number of commercial establishments serving the rural areas and the traveler.

There are between 2000 and 2500 bulk stations within the 48 states. With 2000 bulk stations there would be 1000 customers per bulk station, making the total of 2,000,000 users. In the North you would find a greater number of customers than this per bulk station. In the South the average would be less.

The industry has used the figure of 25,000 appliance sales outlets. Of this number it is estimated that 15,000 are appliance sales outlets from which gas is redistributed to the consumer either by tank truck or by cylinder. When the industry starts to work again on obtaining new users there will be many more than 15,000 combination gas and gas appliance outlets. One can only guess how many outlets handling only the appliances will be established. These latter outlets now range in character all the way from Macys' to the corner drug store in Iowa peddling gas appliances from a manufacturer's catalog.

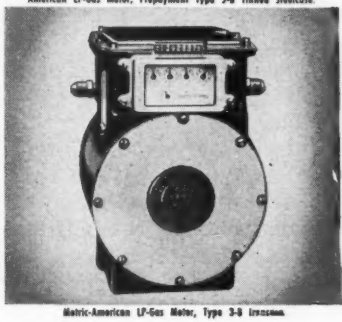
To capture our portion of 20,000,000 homes, our industry is go-

Checked by the record of thousands in service

American LP-Gas Meter, Type 5-B Tinned Steelcase.

American LP-Gas Meter, Prepayment Type 5-B Tinned Steelcase.

American LP-Gas Meter, Type 2-B Tinned Steelcase.



Metric-American LP-Gas Meter, Type 3-B Ironcase.

THE preference of leading LP-Gas distributors for American Meter Company meters is fortified by substantial reasons . . .

▶ A complete line of effective instruments for metering and controlling butane-propane vapors. ▶ American Meter Company experience and manufacturing responsibility give valid weight to its recommendations on the correct application of LP-Gas Meters and Regulators. For 105 years, the manufacturers have successfully anticipated the needs of the Gas industries.

✱ **NEW CATALOG LPG-4 gives valuable data on LP-Gas metering with instruments scientifically suited to the purpose. If you have not received your copy, please write.**

GENERAL OFFICES • 60 EAST 42ND STREET, NEW YORK, N. Y.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

A-1405

ing to have some rough competition. For 25% of the 20,000,000 homes, for other than house-heating, we will compete with kerosene, gasoline, coal and wood. For 75%, other than house heating, we will recognize electricity as our competition. It is estimated that there are 1,500,000 electric ranges now in use in the rural areas. This is doubtless a top figure and of course would include metropolitan fringes, suburban towns, small rural towns without gas mains and farms and ranches. The total ratio then of liquefied petroleum gas users to electric range users is 4 to 3.

Liquefied petroleum gas was not readily available pre-war throughout all areas where electric ranges were sold. Where liquefied petroleum gas was available and where it was promoted, it is our belief that the ratio of liquefied petroleum gas appliance users to electric is 5 to 1. This is still a lot different than the 20 to 1 ratio that we hear expressed in city gas circles and of course means that the competition is that much more severe.

Electric rates are as low or lower in rural areas as they are in the city and that industry has the additional help of the REA subsidy. The advertising and promotion carried on by the electric appliance manufacturer and by the over-all electric industry far out-shadows anything that has been done for or by the liquefied petroleum gas industry.

Someone is always questioning the availability of liquefied petroleum gas to take care of the projected expansion. R. W. Thomas, of Phillips Petroleum Co., addressed the national convention of the Liquefied Petroleum Gas Association in May on the subject of the availability of liquefied petroleum gas. He said (See Butane-Propane News, July, 1946): "There is ample supply of butane and propane for the requirements of motor fuel, aviation gasoline, synthetic rubber, and chemical industries, over and above the requirements of the liquefied petroleum gas industry. In fact, the potential supply far exceeds present demands of these industries."

With ample supplies on hand, there should be 2,000,000 homes today that would install liquefied petroleum gas. However, this demand will fade off due to competition for the customer's dollar for new homes, automobiles, radios, house furnishings and competitive fuel appliances.

In spite of all this competition, what is the reasonable sales capacity of the liquefied petroleum gas industry? If the 15,000 combination gas appliance-gas outlets prewar averaged 30 new customer sales per year, would it not be reasonable to see them average 40 to 50 sales a year now? Many new appliance and gas outlets will be in the market. New bulk stations are being built today in every area throughout the country. Recently, more than a score of prominent men in the industry, upon being questioned, estimated that 1,000,000 new users would be sold during the first 12 months of near-normal activity. To be conservative let's settle for 750,000.

Of these new users, 85% will purchase a range. The balance of the new users will bring their range

When Confidence Counts

you can rely on

UNIVERSAL

"L-P" GAS RANGES

Merchandise that inspires confidence inspires sales! Universal's especially engineered "L-P" Gas Ranges, designed for more effective "L-P" Gas performance, create confidence with every inch of their attractive, dependable construction. You can rely on Universal.

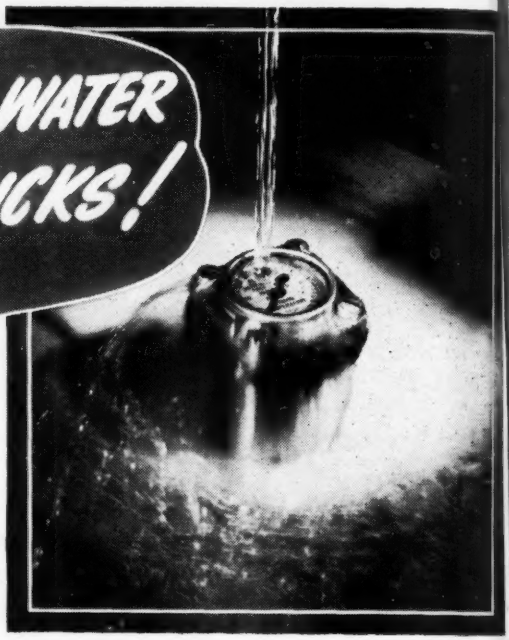
"L-P" GAS
the preferred fuel

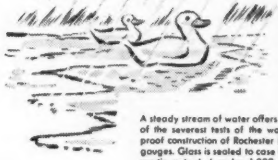
"L-P" UNIVERSAL
the preferred Gas Range!

1946
Still the UNIVERSAL Selection of Cooking Perfection

CRIBBEN & SEXTON
UNIVERSAL *Gas* RANGE
700 N SACRAMENTO BLVD CHICAGO 12 ILLINOIS

THEY SHED WATER LIKE DUCKS!



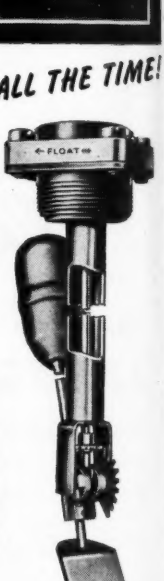


A steady stream of water offers one of the severest tests of the water proof construction of Rochester LPG gauges. Glass is sealed to case with mastic extruded under 1,000 lbs. pressure.

Rochester LPG GAUGES...SEALED AGAINST ALL ELEMENTS ALL THE TIME!

Even a cloudburst wouldn't affect the accuracy of Model 3120 Rochester LPG gauges. They are as tightly sealed as a submarine. Now your glass cannot fog. You can always read it. This kind of protection is one of the reasons Rochester LPG gauges rate so high in the industry. There are many more.

Safety factors are many times higher than normal demands. Float bulbs are built to withstand 800 p.s.i., four times average service conditions! There are no shaft connections through gauge head . . . no danger of leakage. Indication is achieved by means of two permanent magnets, one on the shaft within the tank. the other in the gauge case on top of the tank. Each gauge is individually calibrated. Rochester "Criterion" gauges are listed by the underwriters. Better order now!



ROCHESTER
Manufacturing Co., Inc.

ROCHESTER LPG GAUGES

Model 3120 Gauge (illustrated) fits Bastian Blessing head No. 2465 or Weatherhead Manifold No. 900 as well as pipe thread risers, 1½" or 2". Model 3121 gauge is designed for Bastian Blessing Multi-Valve Multi-Valve head, No. 2418.

Rochester Guaranteed Accuracy

ENGINEERED INSTRUMENTS

LIQUID LEVEL, TEMPERATURE AND PRESSURE GAUGES

with them from town for conversion. Of course these conversions to the liquefied gas industry mean another possible gas range sale to the city gas company. We are a young industry, so replacement range sales are not a tremendous factor but each year we have conducted a roundup of old stoves with good results Many old klunkers moved out from town and converted to liquefied petroleum gas represent the largest replacement field. There must be 10% of the present 2,000,000 users that have old, replaceable, converted klunkers. Perhaps another 5% of the 2,000,000 users represent good replacement sale prospects.

Too Busy to Sell?

Somewhere between 5% and 10% of the present users have an automatic water heater. Our industry has been too busy growing and taking on new customers to devote the necessary energies toward the sale of load building appliances. Twenty-five per cent of the customers should have an automatic water heater now. We should sell an automatic water heater to 3% of the present customers each year and we should be able to sell 10% of the new customers added each year.

Gas refrigerator sales have been about the same in the past as automatic water heater sales. The potential is terrific. More effort on load building appliance sales will produce results.

Furnaces will move in triple and quadruple volumes over 1941 south of the Mason-Dixon Line and in those Western areas where the distribution cost, the inclement weather and competitive market conditions permit liquefied petroleum gas to compete with low cost but less convenient fuels.

You are encouraged to make your own estimates . . . but in any event watch for the liquefied petroleum gas industry to double its total 2,000,000 users of 1945 within five years from V-J Day, and one of those years is almost gone.

Advertising plans, promotional programs, displays, cannot effectively be merely a duplication of city gas materials and methods. The liquefied petroleum gas industry has expanded itself to the place where its volume of business justifies more particular and special attention on the part of the appliance and equipment manufacturer. There is sufficient profitable volume that will stimulate more consideration of this nature on the part of many more manufacturers.

Where the Prospects Lie

The liquefied petroleum gas prospect and future customer lives some distance from the appliance outlet. Furthermore, this customer lives some distance from the next prospect or customer. The dealer's market is as though you have taken a small circle surrounding a town of 25,000 people, blown the circle to a 25 to 50 mile radius and placed the same number of homes equa-distant within this expanded circle. The result is obvious. Sale calls per day are fewer; following up a hot tip is costlier and more time consuming; advertising to reach the market is more difficult; and to obtain the same result is more expensive. Sales, service and installation man-

power hours are greater per unit of sale. Special promotional campaigns of all kinds are more difficult to administer.

These factors are not undefeatable obstacles. Their solution merely calls for a different treatment than that regularly extended through city gas sales and service channels.

A statement was made sometime ago where someone in the gas industry was surprised to learn that in a rural survey a certain percentage of the housewives indicated a desire for a gas range when their homes were not on the gas mains. These rural homes are on the "gas mains" — the liquefied petroleum gas mains. It is no surprise that the housewives want the service. The electric appliance manufacturer is telling his dealers of the huge market in the rural areas. The liquefied petroleum gas industry is telling you that 20,000,000 homes beyond the mains and the organization that is developed to serve those homes represent one of your greatest markets for the sale of gas-consuming appliances.

United Cities Organizes Liquefied Gas Operation

ONE of the newest liquefied gas operations to be undertaken by a public utility is Metrogas, Inc., Chicago, which will reach a potential market of 400,000 population extending from Georgia through North Carolina, Tennessee, Illinois, Wisconsin, and Minnesota.

It is the propane bottled gas affiliate of United Cities Utilities Co., a public gas utility which furnishes, in seven states, services to 17 towns—two with natural gas and the remainder with butane-air, all through underground mains.

A bulk propane plant of Metrogas has been completed at Metropolis, Ill., in which United Cities already has a butane-air franchise, and the second one will be constructed at Hendersonville, N. C.

It is not the plan of Metrogas to distribute propane in the entire area between St. Paul and Atlanta; operations will be confined largely to the territory within a radius of 25 miles of each of the franchised cities served by the utility company.

United Cities Utilities was one of the first companies to distribute butane-air gas through underground mains. All of the 17 town-plants now in operation were built in 1930 and at the outset all distributed butane-air. Hastings, Minn., and Vandalia, Ill., have since been converted to natural gas.

The propane operation will require separate bulk storage equipment and it is planned to serve customers on a metered basis with bills rendered monthly. The company ultimately plans to franchise dealers and to sell propane to other distributors in its bulk plant areas and will fill cylinders for others as soon as bulk plants are placed in service.

R. L. Siebin, president of Metrogas, says that "One of the primary purposes for the organization of this company was to provide a means of continuing to serve valued utility customers who moved into sections of town too far away from gas mains to continue serving them with city gas." Agreements have been worked out between the United Cities Utilities Co. and its Metro-gas-operated affiliate for transfer to each other of customers on a mutually satisfactory basis.

Overheard
AT THE JULY MARKETS
(Range and Heater Dealers Planning Ahead)

"I WANT A SOURCE WITH BIG PRODUCTION CAPACITY"

"GIVE ME THE LINE THAT'S BACKED BY POWERFUL ADVERTISING"

"EXPERIENCE AND REPUTATION COUNT A LOT WITH ME"

"APPLIANCES SHOULD BE DESIGNED FOR EASY SERVICING AT LOW COST"

"SELLING POLICIES SHOULD PROVIDE THE GREATEST POSSIBLE VALUES"

"I WANT CONVENIENT DISTRIBUTION FACILITIES"

"A BROAD LINE FOR ALL NEEDS IS IMPORTANT"

SEE HOW THE FLORENCE LINE "MEASURES UP" ON EVERY COUNT!

• At the July markets we did a lot of listening in on what dealers want in ranges and heaters. Right then and there we found out that the Florence line, Florence advertising and Florence merchandising are *right on the nose*. But you be the judge. You'll see for yourself, as Florence products and plans continue shaping up, that Florence has the kind of proposition you will want "not for just a year—but *always*."

8 REASONS WHY FLORENCE OFFERS BIGGER PROFIT OPPORTUNITIES

1. 74 years of experience in manufacturing and merchandising.
2. A long record of financial stability and reliability.
3. "Straight-line" assembly methods provide tremendous production capacity.
4. The Florence policy of *direct* selling means you can offer greater values.
5. Florence service facilities keep merchandise "on tap" within quick, easy reach.
6. All Florence appliances are designed and pretested for easy servicing at low cost.
7. A wide variety of cooking and heating appliances for all needs.
8. Widespread consumer demand created by powerful, hard-hitting advertising and sales promotion.

FLORENCE STOVE COMPANY...General Sales Offices and Plant: Gardner, Mass. Western Sales Offices and Plant: Kankakee, Ill. Southern Plant: Lewisburg, Tenn. Other Sales Offices: One Park Avenue, New York; 1459 Merchandise Mart, Chicago; 53 Alabama Street, S. W., Atlanta; 301 North Market Street, Dallas.

FLORENCE
LP-Gas Ranges

New Transport Design Will Reduce Chance of Accident

THE Imperial Gas Co., Los Angeles, has recently accepted delivery of a propane transport that was built to attain the highest possible degree of safety in such mobile equipment.

A. N. KERR

The spheres were made by the Superior Tank and Construction Co., of Los Angeles. The truck is a Mack, of the largest size made, with a bore and stroke of 5x6 and 707 cubic inches displacement. The trailer was built by the Fruehauf Tailer Co. of California.

The details of construction and design will give dealers important information, helpful when similar equipment is needed, believes A. N. Kerr, president of Imperial. He points out below the special features:

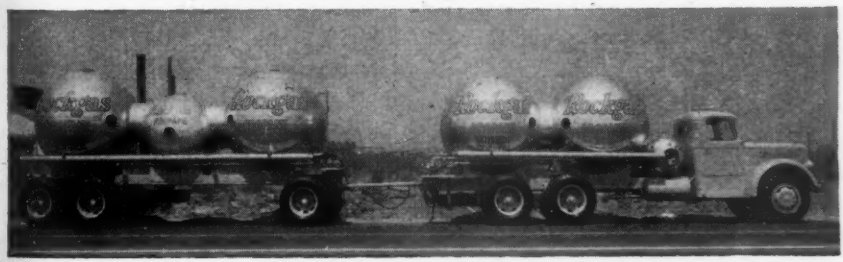
"The drive is on all four wheels. These are fitted with an adjusting device so as to prevent tearing out the gears.

"Truck and trailer are equipped with Westinghouse air brakes. The tires on both truck and trailer are 11x22, a size commonly used for heavy trucking.

"The trailer has three axles as this form seems to wear better in heavy service, giving a better braking effect.

"This truck and trailer is a length limit, weight limit job. In other words, both truck and trailer haul as much weight as it is allowed in California.

"The spheres are 23% lighter than spheres have usually been manufactured. They are built out of A-212 grade B, firebox steel and have a thickness of ⅜", whereas spheres heretofore have had a thickness of ½" on an 8 ft. diameter. Four of the spheres are 8 feet in diameter. One is smaller, as the load of three spheres



Propane transport truck (Mack) and trailer (Fruehauf) with combined load of 7400 net gallons of propane at 250 psi, not including 150-gal. propane tank just back of truck cab.

would have been to heavy for the trailer. The total propane carried is about 7400 gallons. This load might have been somewhat higher had not the truck and trailer both been of extra heavy weight and size.

"This truck and trailer were built to haul from Kettleman Hills at times when the roads were wet and slippery. It will normally deliver gas from a switch owned by the Imperial Gas Co. at San Pablo, Calif. Tank cars will be unloaded at San Pablo as it is not felt that the truck can compete with rail rates from Kettleman Hills. However, in case of shortage of supply it will be necessary to send the truck and trailer at times to Kettleman Hills.

"The spheres on the truck hold 3276 gallons. The spheres on the trailer hold 4004 gallons.

"The spheres back of the cab are two 37" diameter spheres for propane fuel for the engine. The engine is operated with a Century carburetor of the largest size so that cylinders need not be starved. It is commonly known that valves will be burned if cylinders are starved on propane and butane engines.

"The most noteworthy feature of this truck and trailer is a new safety feature built for the unloading of the spheres into storage.

"During the past five years, quite a good many truck and trailer accidents have occurred due to the fact that the hose has pulled in two at the time of unloading. These trucks were being unloaded by pumps operated by the truck motor. This truck motor ignited the escaping gas.

"In order to approach this unloading from a more rational direction, a 3-horsepower motor and a 2" Smith pump have been directly connected together and set at the unloading pipes on both the truck and trailer.

"A 75 ft., 3-wire cable then is connected into the electric lines at each of our bulk stations. This connection is made at a point which is normally outside of the range of any escaping gas. If then the hoses pull apart or gas escapes, the explosion-proof motors will not ignite the gas as the motor on the truck would have done.

"Our first trial of this apparatus unloaded the truck in 55 minutes. The unloading by this means we believe to be safer than the small gas engines formerly employed.

"If past experience shows anything, it is that trucks should not be unloaded by means of a gas engine which can ignite the gas. We believe that all trucks should be unloaded by permament pumps and motors installed at the bulk plants. There are cases where the equipment is not available at the bulk plant. In such cases, this portable motor and pump serve the purpose.

"Nearly all transporters of propane and butane would not find their conditions as uniform as ours. We own nearly all of the bulk stations and therefore can supply electric connections and current at each point to to which the truck makes delivery. The truck and trailer make delivery to six locations in northern California.

"This truck and trailer replaces a 2300 gallon, 2-sphere truck which has operated about 150,000 miles. It is now too small and will no longer serve the purpose."

Dr. Foster Dee Snell Is New President of Chemists

Dr. Foster Dee Snell, president of Foster D. Snell, Inc., consulting chemists and engineers, Brooklyn, was elected president of the American Institute of Chemists at its annual meeting held May 17 at the Hotel Biltmore, succeeding Dr. Gustav Egloff of Universal Oil Products Co., Chicago.

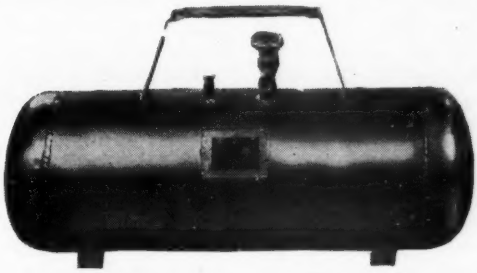
BUTANE-PROPANE BOTTLES

For Immediate Delivery

COMPLETE WITH POL AND 10% VALVES

☆

HEAVY GAUGE STEEL



HORIZONTAL TYPE FOR BUTANE OR PROPANE

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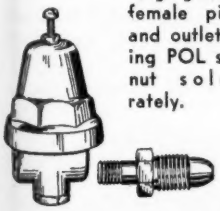
APPROVED BY ASME AND API

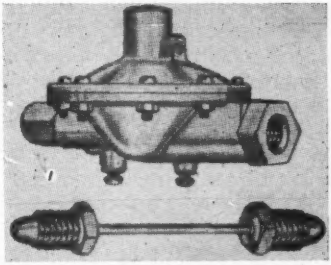
Available in 5, 8 and 10-Gallon Sizes

WHOLESALE ONLY — WRITE OR WIRE FOR PRICES

HIGH PRESSURE (propane) REGULATOR—Adjustable from 0 to 25 pounds outlet pressure. Made of yellow brass forgings. ¼-inch female pipe inlet and outlet. Matching POL spud and nut sold separately.



BUTANE-PROPANE LOW PRESSURE REGULATOR—A heavy duty regulator suitable for any L.P.G. use. Handles inlet pressures from tank up to 250 lbs. Load capacity 200 cu. ft. per hour. Approved by California Industrial Safety Division. Fittings — inlet POL, outlet ½ inch.



WE HAVE A LARGE STOCK OF BUTANE 2-BURNER HOT PLATES AND MANY OTHER L. P. G. ITEMS.

WHOLESALE ONLY — WRITE OR WIRE FOR PRICES

Coast-to-Coast
TRAILER SUPPLY COMPANY
Main Office
823 WEST SECOND ST., LOS ANGELES 12, CALIFORNIA
AMERICA'S LEADING WHOLESALE DISTRIBUTOR OF TRAILER PARTS AND SUPPLIES

Order Book for Drivers Speeds Service

MUCH lost motion and many mistakes in propane gas and equipment have been eliminated at Valley Butane Service, Fresno, Calif., as the result of a "Driver's Bible" kept on the office counter of the company.

Since the beginning of the war, when gas volume went up sharply and less employes were on hand to carry out the work, everybody in the firm, including the owner, John Agbashian, spends most of their time answering calls. Consequently there was seldom any opportunity of exchanging information and making special assignments, since the company employes seldom saw each other through the day. Even an office girl who answered the telephone and kept books was usually too busy to talk individually to drivers or salesmen coming in between calls. Thus many customer's feelings were ruffled when gas calls went unanswered, and repairs which should have been carried out rapidly were delayed for a day or two.

The solution to these problems is the "Driver's Bible"—a large leather covered book of the ledger variety which is kept conveniently on the office counter where all employes check in. Its pages are used to conveniently jot down everything which concerns anybody in the firm.

The book is kept up by the telephone girl, who writes up each request as it comes in, or notifies drivers of anything extra to be done as the result of a call. The pages are simply divided into individual notes by drawing a line between each one. Each such note is headed with the driver's first name in large letters, so that by flipping over two or three pages, any driver can find all items which refer specifically to himself.

Time is left open in the daily schedule to permit each of the four regular drivers to run in at least one extra call—since the company's experience has been that there will be from three to five such instances every day. Usually these concern customers who ask for delivery of gas at a particular time.

A typical note reads "Out of gas at

A huge ramp in front of the Valley Butane Co., Fresno, Calif., provides ample parking space for hundreds of trucks and tractors for fuel and conversions to B-P Gas carburetors.

WE DON'T LIKE TROUBLE CALLS EITHER

That's why we recommend that RHEEM appliances be installed by a Master Plumber

Figure it out for yourself. An appliance is no better than the man who installs it.

That's why we're sending the public direct to the Master Plumber. We want people to have the benefit of a household engineer's knowledge.

It's good business for the plumber. And it's good business for us too. By insisting that our products be installed by licensed experts

we're making sure that every RHEEM appliance means a satisfied customer.

That's why we say—"Ask your Master Plumber."

RHEEM ... *making houses into homes*

RHEEM MANUFACTURING COMPANY • 570 LEXINGTON AVENUE • NEW YORK CITY 22

Willberson's. Go to third house on the right past Claremont on Shields Road and fill up early in the morning. Charge for 300 gallons." Others state "Floor furnace won't light at 4515 Olive Ave. Light pilot and fill tank." It is the responsibility of each driver or repairman to do the work and then cross out the note when checking in at closing time.

Although the book has such informal entries as "John, bring home a dozen eggs," etc., it has proven the most efficient method of "catching the loose ends," according to Valley Butane Service. Few calls go unanswered, and those which do are invariably taken care of the following day.

War-Time Fire Extinguishers Need Frequent Inspection

Fire protection authorities constantly urge proper maintenance and annual inspection of fire extinguishers to assure satisfactory operation in emergencies. The usual annual inspection may, however, be inadequate for the "EAS" devices (extinguishers approved by the Underwriters' and Factory Mutual Laboratories under Emergency Alternate Specifications) produced during the war, when lack of critical materials made necessary the use of substitutes.

A comparison between some of the materials used in the standard units and those in their substandard counterparts will make clear why it is essential to be on guard against deterioration.

The shell of all 2½-gallon pressure units bearing EAS approval was made of steel instead of copper which is used for the shell of the standard extinguisher. This was true also of one-gallon pressure type vaporizing liquid units. Steel is, of course, far more subject to corrosion than copper.

The inner cylinder of foam extinguishers, normally of tinned copper, was made of steel coated with porcelain enamel which was also used in place of brass in the construction of the pump in EAS pump tanks. Subject to cracking, porcelain enamel parts require frequent and careful inspection.

Pump packings, gaskets, and similar parts ordinarily made of natural rubber were made of synthetic rubber. Hose of all EAS extinguishers was made of reclaimed rubber. Loss of flexibility, with consequent cracking, must therefore be anticipated.

Unimportant to the proper functioning of an extinguisher but vital to its identification is the name plate. This was decalcomania on the EAS units, rather than the metal name plate which is soldered or welded to the shell of standard units. No satisfactory method for permanent application of the decals was ever found. It is therefore necessary to make sure the name plate has not peeled off or that the extinguisher type is identified by some other means so that when fire breaks out the extinguisher used will be suitable for the class of fire involved.

Florida Dealer Will Build 18,000-Gallon Bulk Plant

Parks Furniture Store, Kissimmee, Fla., agent for Green's Fuel, will begin construction of a bulk fuel gas station immediately, according to Henry Simmons of the company.

The bulk station will have a capacity of 18,000 gallons and will be located on the old Tampa highway. The Atlantic Coast Line will begin construction of a spur track soon.

A special tank truck has been purchased for delivering the gas under pressure to home storage tanks.

THE ACCEPTED STANDARD FROM COAST TO COAST

leading
engine
builders
choose

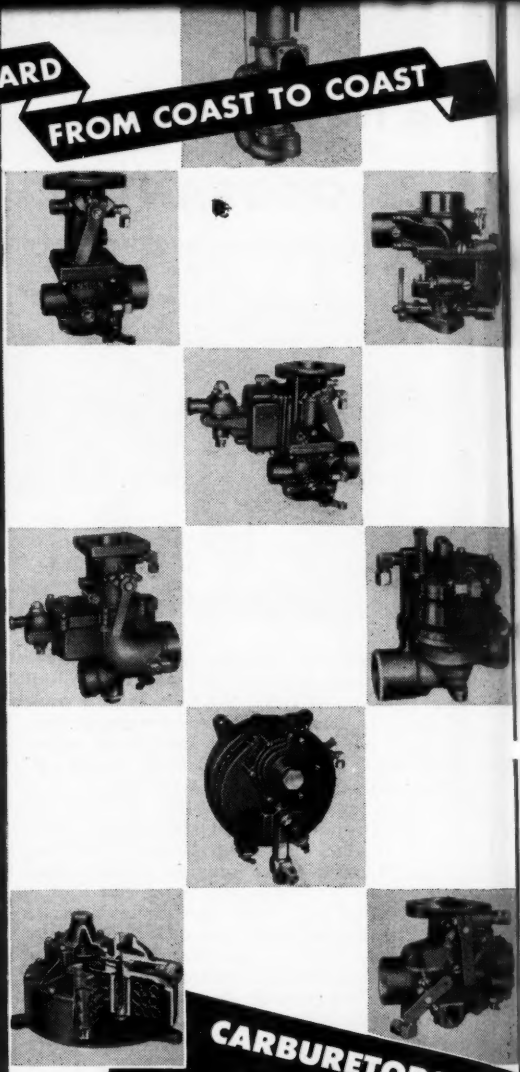
ENSIGN

for

efficient
engine
performance

on

butane - propane
natural gas
manufactured gas
sewer gas



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FOR EVERY
ENGINE REQUIREMENT
5 to 500
HORSEPOWER

ENSIGN CARBURETOR COMPANY

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FACTORY BRANCH: 2644 SOUTH MICHIGAN AVENUE, CHICAGO 16, ILLINOIS
"PIONEERS IN EFFICIENT CARBURETION" • *ESTABLISHED 1913*

POWER

Build Summer Load on Engine Fuel

By RALPH G. ABBOTT*
Ensign Carburetor Co., Dallas, Texas

IN the spring time a young man's fancy lightly turns—In the spring time your thoughts turn with a bump to "How am I going to build my summer load, or fuel sales?"

RALPH ABBOTT

There are several reasons for this. First of all, you make money when your trucks are delivering gas. Second, many of the fuel suppliers are giving bonuses for an even year-around-load. Others are allowing a winter fuel supply of three or four times the average monthly summer purchases.

You can flatten the peak somewhat by selling your customers bigger tanks and by filling them in the summer time. Later on I will try to show other reasons for always selling the customer larger tanks—of 300 to 1000 gallons. However, even with the larger tank, your customer is not using any more fuel, he is merely supplying you with larger storage.

The question is how to increase the use of gas by your customers, especially at off-peak times.

The answer is, industrial applications, applications of power and heat. For simplicity, I am considering all applications of heat and power as industrial that are used outside of the home, your domestic customer.

There have been numerous articles written and printed covering various phases, all mighty good, but by far the best was the table presented in the April issue of the Butane-Propane *News*. How many of you saw it and read it?

Perhaps the most universally distributed power over Texas is the farm tractor. Each and every one is a prospect for you. Each and every tractor will consume one gallon of butane for every 10 horsepower developed for one hour.

From records of various tractor companies, the fuel consumed averages about 2 to 3 gallons per hour, depending on size and load. Also, from the same records, we find the average use of a tractor is from 750 to 1000 hours per year. That is some 1500 to 3000 gallons a year per farm you have been overlooking, all of which comes in the summer time.

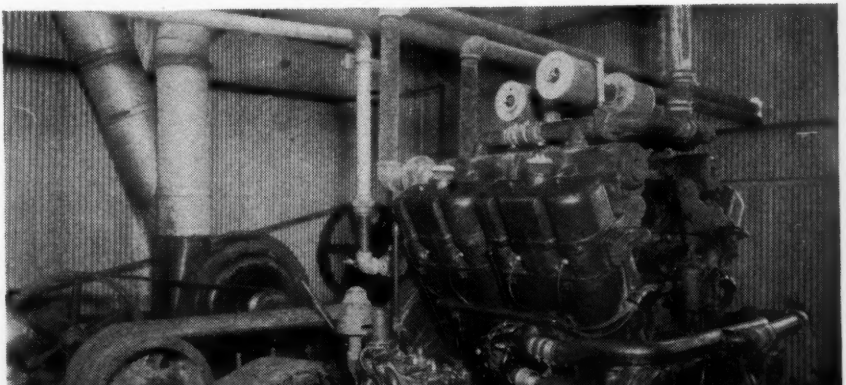
You are doing your farm trade a favor when you build your sum-

*A paper delivered before the Texas Butane Dealers Association convention at Fort Worth, June 11-12.

mer load, for butane as a motor fuel is tops.

Butane for a motor is stored in a fuel tank as a liquid, just like the underground tank. The tank pressure pushes the fuel to the vaporizer, thereby eliminating the gasoline fuel pump which usually is a source of trouble and needs repairing frequently. The liquid butane is completely vaporized to a dry gas in the vaporizer, using the engine water to supply the heat. The high pressure gas is carried through two stages of pressure regulation. In our case the engine, or motor, actually sucks the fuel through the second regulator and into the venturi of the carburetor. At the venturi it is mixed with air into a homogeneous mixture of dry gas and air in proper proportions.

Because we are handling a dry, gaseous mixture, we have eliminated distribution problems in the manifold and can thereby show a slight increase in horsepower. Because of the dry gaseous mixture, all cylinder wall wash is eliminated, which at once gives your customer a longer running engine or tractor. We have found from experience that the engine life, between major overhauls, is lengthened two to three times over gasoline and as much as five to seven times over distillate. Because of no cylinder wall wash, the oil can be run four to six times as long between changes. Usually your price of butane is



Butane engines are widely used in Southern cotton ginning operations, as shown here.

Propane-fueled, heavy duty tractors grading roads in the Midwest.

considerably less than the cost of gasoline.

So at once you can show your customer a saving in repairs, an oil saving and a lower fuel cost. You do your customer a favor by building yourself a summer fuel load.

The chemical characteristics of butane-propane mixes give it an octane rating between 100 and 125, depending on the amount of propane in the mix. This is equal to the finest grades of aviation gasoline. To date, we have only a few engines capable of holding the maximum compression ratio the fuel will stand. However, practically every tractor and engine company have high compression heads or high altitude pistons available which permit more work done per gallon of fuel used.

One tractor company has a factory installed butane tractor which has shown under competitive disc plowing that it could plow the same depth and same number of plows one gear in the transmission faster than gasoline. Several of the blockmen of this company have indicated that as many as 20% of the orders from their areas are for butane equipped tractors.

One of the butane tractor problems has been fuel storage. This has been somewhat taken care of by installing aboveground tanks. This meant a separate tank from the customers present underground system. One of the companies exhibiting at this convention has brought out a new hand pump with claims it will pump out of an underground tank, if a ¾" pipe liquid line is installed in the tank. This may be the answer to our problem. You want to consider this when you sell your next tank. Ask yourself before you close the deal, will this tank be big enough for tractor and engine storage, and can we get liquid out of it.

When you are at your customer's place, look around; maybe he has an engine on a grist mill, maybe a

light plant, maybe he has a small feed dryer. Each one requires fuel, your fuel. Add all his horsepower together and divide by 10. This will give the number of gallons per hour he can use. Most dryers require power to turn them, so just run a dry gas line from the engine vaporizer to the burner.

Those of you in the cotton producing areas are standing on the threshhold of a new method of cotton farming which will use unbelievable amounts of fuel, namely flame cultivation. Flame cultivation replaces the hand labor of hoeing and chopping cotton. It is also used to prepare the cotton for mechanical pickers. Flame cultivators have two burners per row of cotton, each consuming approximately 1⅛ gallons of butane per hour. At the present time they are built in two and four row machines, which mean four or eight burners. The average cotton chopper has more burners per row.

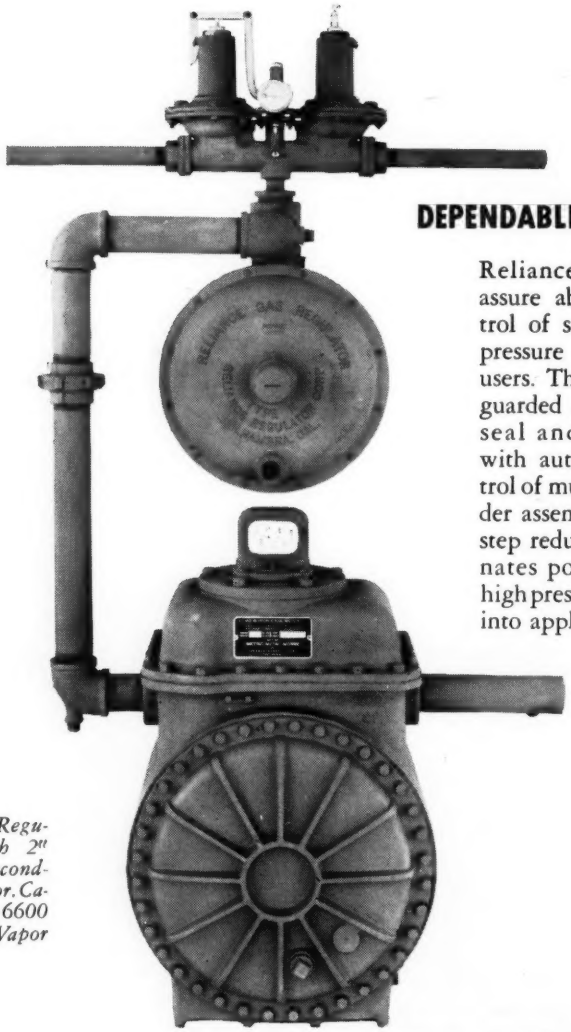
We recently made vaporizer installations on some four row, 16 burner choppers which used 19 gallons per hour. These units previously had to operate on straight propane. Even then the 110 gallon tank would freeze up before all the fuel was used. After the installation they were able to operate on the usual summer mix of butane and propane until the tank was empty. This is a boon to you all who do not have propane transports and storage.

From the field, the cotton goes

to a cotton gin, which has to be power driven. The average gin requires 150 to 200 horsepower. Remember the figure earlier given, one gallon of butane will develop 10 horsepower for one hour. Here is another 15 or 20 gallons per hour for you. To insure uniform cotton ginning, many ginners are installing dryers. These dryers are usually 1,500,000 Btu's per hour capacity. Here is another 15 gallons of butane per hour.

Practically every section of the State has or will have feed dryers or dehydrators. Each and every one requires heat and wherever heat is required, butane is needed. Dehydrated foods are just now coming into their own because of the benefits found from such foods during the war. Both food and feed retain higher contents of proteins and vitamins when dehydrated as against sun drying. A recent vaporizer installation on a spinach dehydrator gave a fuel dealer a load of 30 gallons of butane per hour. Incidently, this dehydrator only operated the last 22 days of May, 16 hours per day, and consumed 10,560 gallons of butane.

Irrigation is coming up fast. The Texas Panhandle probably has more irrigation wells than any other section of the world. It has been authoritatively said, there are more butane equipped engines and tractors in this area than any other area in the world. These engines like all others require one gallon for every 10 horsepower developed for one hour. There are many irrigated areas in the State, namely the Pan-



Type MC Regulator with 2" Type H Secondary Regulator. Capacity up to 6600 cu. ft. of Vapor per hour.

DEPENDABLE SERVICE

Reliance Regulators assure absolute control of steady outlet pressure to L-P gas users. They are safeguarded by a safety seal and installed with automatic control of multiple cylinder assemblies. Two-step reduction eliminates possibility of high pressures getting into appliances.

AMERICAN METERS

RELIANCE REGULATORS

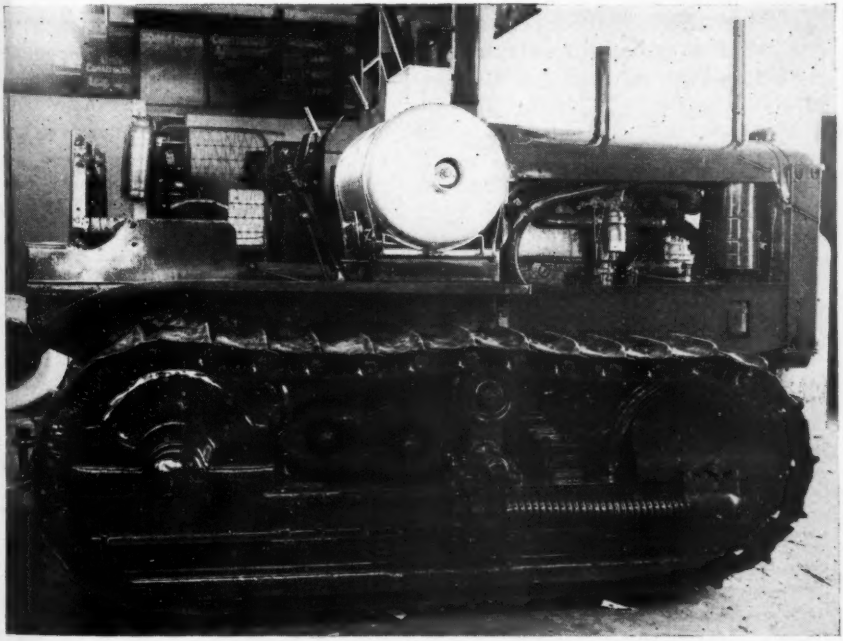
RELIANCE REGULATOR CORPORATION
1000 MERIDIAN AVENUE ALHAMBRA CALIFORNIA

handle, the Valley, the Gulf Coast, North Texas and many scattered areas of Central Texas.

Irrigation is probably the biggest field of your activity that the power companies and the REA are trying to cut into. Electricity will never be a true competitor. We have found over the years that a butane equipped engine can replace any electric motor and if the monthly electric bill is $75, or over, the butane equipped engine will pay out in a year's time.

Those of you near an oil field are sitting on a gold mine. Drilling rigs are the largest consumers of fuel. A rig may vary from the small, slim hole, 145 horsepower, up to the large five engine, 1700 horsepower giants. Here again the same 10 horsepower per gallon per hour holds true. In some areas the smaller pumping and pipe line engines run on butane.

The timber areas of the State afford an ideal summer industrial load. I read in a local newspaper where slightly over 300 new saw mills had been installed in the past year. These mills run in horsepower from 50 up to 200, each. Like all other engines, you do your customer a favor by converting his engine to butane. He uses considerably less oil, his engine runs a lot longer and his fuel cost is less. To top it off, you build yourself a 1250



B-P Gas carburetion equipment and high pressure tank mounted on track-laying tractor.

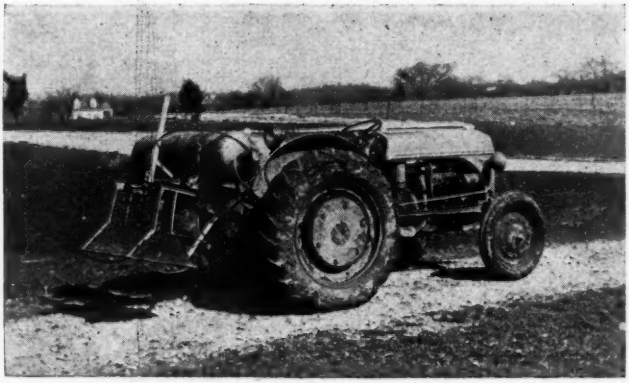
to 5000 gallon a month industrial load.

Due to the rehabilitation of the highways and railroads, sand and gravel pits are opening up all over. These require power, engine power which works longer and better on butane. The railroads have found dry sand is better to use so many are installing dryers. These dryers are engine driven and require heat; heat comes from butane.

Trucks offer a very broad field. From your standpoint of fuel, the over-the-highway, or truck lines, are not too good, for many of the trucks go out and don't get back for a week or more. From the truckers standpoint, the inability to get fuel in all places of his operation is a stumbling block. The most desirable fleets are those that come back to one point every night—those that come to a place when either you can establish a fuel station or can set a storage tank. Milk lines, bread trucks, large ranch fleets are ideal. Gravel and road building fleets of trucks and tractors all operate from one storage and offer a large monthly consumption of fuel.

You may wonder how to get these industrial loads. The answer is to analyze your territory. Make a note of the possibilities as you drive over your territory. Do you remember that country filling station where you set an underground tank last winter for heating? He wants an air compressor, lights and possibly other equipment. It is true these all are small engines but they only require a fuel control regulator and can be hooked onto the stove line. They all consume butane.

Have your fuel delivery men make a list of every piece of power and heating equipment your customers have; add to this list what you think your customer needs. You know when you sign up with any city utility company, they ask you what appliances you have. They catalogue those cards and plan their mail advertising accordingly. You can do the same with your customers. When a customer comes into your store or you contact a new customer find out what he needs, not necessarily what he wants. Find out



▲

This propane burning tractor, equipped with flame weeding burner, operates on row crops in Ohio.

▼

what he has in the way of equipment and from this sell him the size of tank with the kind of fittings he needs to do his job well. Invariably this will mean a bigger tank than what your customer came in to buy.

After you have assembled and catalogued your customer's needs, plan your sales and advertising programs. Direct them toward what he needs to do his particular job better, easier, and more economically. It would be mighty wise to furnish each of your fuel delivery men, each of your installation men and each of your salesmen a copy of that list printed in the Butane-Propane *News* under the heading of "Ways to Balance Load."

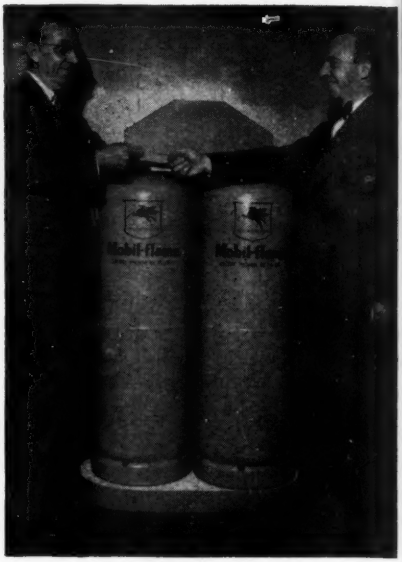
Keep your men on the alert for wherever power or heat is used. Remember—you are doing your customer a service when you convert his power or heat to butane-propane, for he can do a better job, cheaper. Your summer industrial loads are waiting for your knock at the door, they will not come to you.

Adopt as your motto, the American Gas Association's motto, "You can do it better with gas," only change the word gas to butane-propane.

Gentlemen, the plums are ripe, awaiting your picking.

Socony-Vacuum Oil Co. Plans Dealer Distribution of B-P Gas

Socony-Vacuum Oil Company, Inc., has announced plans for the manufacture and marketing of "Mobil-flame," a liquefied petroleum gas.



As a reward for suggesting the name "Mobil-flame" for Socony-Vacuum Oil Co.'s new product, Thomas J. Griffin Jr. (right), marketing assistant in the company's Brockton, Mass., office, receives a check from J. M. Martin, manager of the eastern marketing region.

"Mobil-flame" will be manufactured at Socony-Vacuum refineries with supply points to be established at Portland, Me.; Boston, Mass.; Burlington, Vt.; Hartford, Conn.; Buffalo, Albany, Newburgh and Syracuse, N. Y.; Paulsboro, N. J., and Baltimore, Md. Additional supply points will be established upon completion of a survey, which has been underway for several months.

Marketing of Mobil-flame is being established on the basis of exclusive marketing areas with selection of representatives based on ability to supply not only the fuel but household appliances equipped to use liquefied petroleum gas.

Roundtable For State Associations Will Feature NBPA Meeting September 23-25

PROGRAM arrangements are developing rapidly for the forthcoming national convention of the National Butane - Propane Association, scheduled for Chicago, Sept. 23-25, at the Continental hotel.

Already booked for talks are Dr. Witt Emory, president, Small Businessmen's Association, Chicago; Charles R. Bailey, National LP-Gas Institute, Tulsa, and J. H. Winton, Winton Automatic Gas Co., Beaumont, Texas.

One of the most interesting features planned, according to E. E. Hadlick, executive vice president, is a roundtable session composed of the presidents and secretaries of all state associations who will thresh out some of the important problems confronting these groups and the industry.

An Association-sponsored safety training program discussion will be held under the direction of the Safe Practices and Public Relations committee. Both sessions will be open to all who wish to attend.

An exhibit of industry equipment and appliances will be held in the hotel during the three days of the meeting. Already more than half of the available space has been allotted to manufacturers who are desirous of showing attendants the new models so long awaited.

The NBPA has recently adopted an emblem for the Association, reproduced above, which will be made available soon to members to use on their company stationery and in advertising.

California Safety Body Plans B-P Gas Code Changes

As a result of petitions made by California manufacturers of pressure vessels, and others concerned, certain revisions have been proposed for the California liquefied petroleum gas safety orders which became effective last Jan. 1.

Meetings have been held for industry members to express their opinions regarding code changes and the proposed changes have been mailed to industry men.

Safety laws in California have been promulgated by the Industrial Accident Commission in the past. This branch of state government will now be called the Division of Industrial Safety.

CALENDAR

Sept. 19-21—Oklahoma Liquefied Petroleum Gas Association. Oklahoma City. Skirvin hotel.

Sept. 23-25—National Butane-Propane Association. Chicago. Continental hotel.

Week of Oct. 7—American Gas Association, Atlantic City.

Week of Oct. 7—Northeastern Section, LPGA.

Oct. 11—California Natural Gasoline Association. Annual Fall Meeting. Ambassador hotel, Los Angeles.

Oct. 14—Colorado Liquefied Petroleum Gas Association. Denver.

LPGA Official Opposes 5-Year Cylinder Test

IN a recent letter addressed to the Liquefied Petroleum Gas Association, H. K. Strickler, president, The Protane Corp., Erie, Pa., discussed many angles of the quinquennial retesting of liquefied petroleum gas cylinders.

H. K. STRICKLER

Mr. Strickler cites reasons why he believes the periodical testing required by the Interstate Commerce Commission is ineffective and unnecessary, summing up, in part, his objections to the present requirements as follows:

"We are fighting this situation:

"Because it results in great expense and is a ridiculous procedure;

"Because it serves no useful purpose;

"Because it damages the cylinders and in many cases causes expensive service in the field;

"Because no one has any technical or practical reason to justify one, two, five or ten or twenty years as a time for investigation;

"Because the cylinders are originally hydrostatically tested and there is a good reason for this procedure. A similar reason never results subsequently unless cylinders have been damaged at which time they should be tested even if they are only a few days' old. There is a lot more danger from neglect of valve equipment;

"Because galvanized cylinders never should be retested unless they show dents or evidence of having been in a fire;

"Because equipment of this nature in many other fields requires no test whatsoever with even more hazardous liquid and with less substantial construction;

"Because through active and determined opposition to retesting on the part of buried tank marketers, a retest procedure was eliminated. Our company has a large number of buried tanks and I am not taking a shot at any other group in the industry when I make the statement that it is not only unfair but ridiculous in the extreme to require retesting of cylinders which are constantly in view for superficial examination and allowing those which are hidden from view to go untested. The argument used for elimination of test on underground tanks is just as applicable, and more so, for cylinders.

"Because unscrupulous marketers and those for whom this policing action is apparently designed never intend to test their cylinders anyway;

"Because by setting such a period for retest we are placing ourselves in a beautiful position for legal attack in case of accident should any of these cylinders pass by the period through error, carelessness or through the very prevalent reason that a cylinder can in many cases remain in use for six months or a year or even five days or a week past the test period unless a four year plan is adopted in order to be sure the five year plan is complied with. Why

THE *Top Griddle* IS BACK

When WEDGEWOOD originally introduced the Top Griddle it met with instant acclaim and enthusiasm from housewives everywhere. Then came the war. The resources of the James Graham Mfg. Co. were engaged in Government work. We had to discontinue this popular model. But here it is again, better than ever, available to WEDGEWOOD dealers.

MODERNS PREFER GAS

WEDGEWOOD LEADER IN THE WEST

JAMES GRAHAM MFG. CO.

LOS ANGELES • GENERAL OFFICES & FACTORY, NEWARK, CALIF. • SAN FRANCISCO

should we place ourselves in such a vulnerable position?

"Because in some areas there has been an epidemic of theft and misappropriation of cylinders. These have been filled periodically without the consent and without the knowledge of the owners of the cylinders. Supposing they are filled and held beyond the five year test. How can one prove that he did not fill this cylinder and it was in use for a period beyond the retest period with his own gas? The cylinder might be damaged in filling, it might be improperly hooked up and in any event if the name of the owner appeared on the cylinder he would be in an unenviable position."

Bottled Gas Firms In Consolidation

MARK ANTON, president of Suburban Propane Gas Corp., announced in June that, subject to the requisite approval of regulatory bodies, the corporation has entered into an agreement to acquire more than 90% of the common stock of the Eastern Shore Gas Corp., one of the largest marketers in the East of bottled gas, outside of the corporation, itself.

MARK ANTON

Eastern Shore Gas Corp. serves the eastern shore of Maryland and part of Delaware and Virginia, which make up the Del-Mar Peninsula. This acquisition is strategically located between areas presently served by Suburban Propane Gas Corp. and fills in its distribution position in that section of the East.

For the time being, the Eastern Shore Gas Corp. will be operated as a subsidary. Except for W. H. Wulf, the directors of Eastern Shore will be replaced by those of the Suburban Propane Gas Corp. Mr. Wulf, however, will retire as President and except for this change the entire organization will remain intact.

Certain utility properties owned as subsidiaries of Eastern Shore Gas Corp. will be included in the negotiations and it is contemplated that these will be sold, and the proceeds from the sale, together with cash from Eastern Shore's treasury, used to retire existing debt and preferred stock of Eastern Shore Gas Corp.

Many sales and operating advantages will be gained through more comprehensive coverage of the eastern bottled gas market and the addition of well in excess of 10,000 customers, it is anticipated.

Elect Fred J. Wetzel President Of NGAA Supply Men

At the meeting of the Natural Gasoline Supply Men's Association board meeting held in Dallas April 17, the following officers were elected by unanimous voice vote:

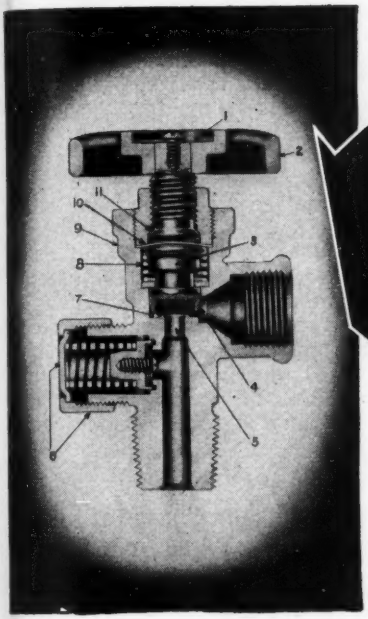
President—Fred J. Wetzel, Ingersoll-Rand Co.

First Vice President—John Heinzerling, Vinson Supply Co.

Second Vice President—Roy Bush, Nordstrom Valve Co.

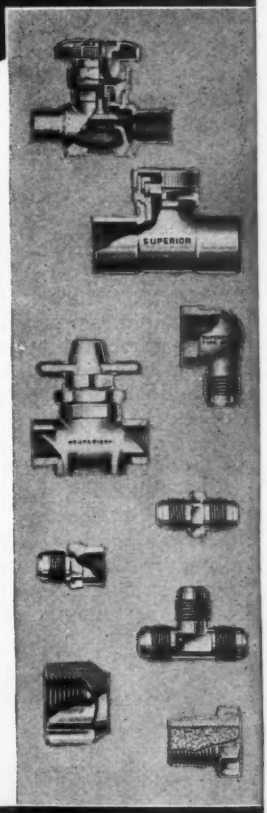
Treasurer—J. A. Knebel, J. A. Knebel & Co.

Wm. F. Lowe is secretary of the organization.



CHECK THESE . . . FEATURES OF *Superior* LP-GAS VALVES

SUPERIOR LP-GAS CYLINDER VALVES are listed as Standard and for Re-examination Service by Underwriters' Laboratories, Inc.



1. *Etched name and handwheel retainer plate
2. Octagon grip handwheel—easy to operate
3. Husky *one-piece* lower stem
4. Improved construction for locking seat securely
5. Generous opening permits rapid filling of cylinder
6. New, unique safety relief construction
7. Body seat design minimizes wear of vital parts
8. Strong spring assures positive valve opening
9. Sturdy forged brass body
10. Multiple metal diaphragm forms positive pressure seal
11. Metal-to-metal backseat when valve is fully opened

There's a complete line of SUPERIOR cylinder, globe, line and angle valves—diaphragm packless and wing cap—in flare or sweat sizes; sight glasses, suitable for any normal LP-Gas pressure; fusible metal plugs; and flare fittings—*listed as Standard by Underwriters' Laboratories, Inc.*

*Customer may specify special printing, and own trade name (special to order).

Write for complete catalog

NO. 133 A

SUPERIOR VALVE & FITTINGS COMPANY
PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES • STOCKS CHICAGO (6) • LOS ANGELES (15) • JOBBERS EVERYWHERE

New Products

Safety Control Valve

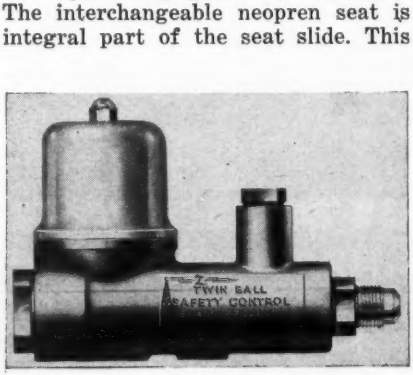
Beam Products Manufacturing Co., 1206 E. 6th St., Los Angeles 21, Calif.

Model 605—6 volts; Model 1205—12 volts.

Description: This safety control valve was developed to meet the need in the butane-propane industry for a positive lock-off which would shut off the fuel supply from tank to engine when the engine was not in operation. This valve is known as the Twin-Ball Safety Control and operates on the solenoid principle with a leverage of 8 to 1.

It is designed primarily for mounting in fuel lines of B-P Gas equipped trucks, tractors and other engines. It shuts off the fuel at the tank or on any spot on the line. It helps to prevent fires, saves fuel and protects the equipment. Regulators may be operated at higher primary pressures.

The Twin-Ball Safety Control does not contain any diaphragms or springs; does not depend on any engine part or vacuum for operation. Its lever design is original and does not require hinge pins for lever action. The interchangeable neopren seat is integral part of the seat slide. This seat slide is adjustable to any position in relation to the brass seat connection at the exit end. In this manner the valve is easily converted from normally closed to normally open for various uses.

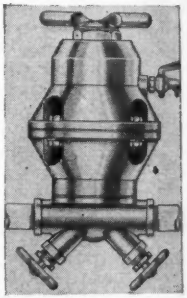


This valve works efficiently as electrically operated valve for air horns. It operates on 6 volts or 12 volt battery, depending on model. Will also be available for 115 volt. It is finished in baked green crackle ⅜" female flare inlet, ⅜" male flare outlet.

It is recommended that the solenoid be connected so that it is only energized when the ignition switch is turned on. By installing a hidden switch it can stop many car or truck thefts.

"Micromet Feeder"

A new company, the No-No Specialty Co., of 6915 Quincy Ave., Cleveland, Ohio, has been formed to handle the national distribution for "Micromet" and "Micromet" Feeders, for water treatment.

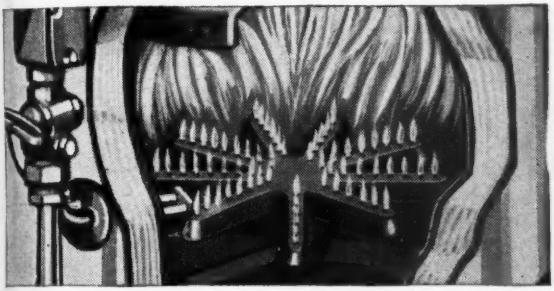


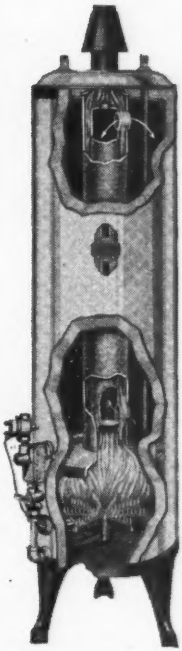
The Micromet feeder is a simple patented device designed for adding Micromet in just the right amounts to the water system when installed on the cold water intake line. It is used on the incoming line of a hot water tank to prevent clogging of the heating coils and service lines through the formation of lime scale. It can also be used to protect the entire system.

The basic principle in this system is the use of phosphate glass which has definite characteristics enabling it to prevent scale formation and con-

MISSION ENGINEERED

More Hot Water Per Minute *At Less Cost*





THE Bunsen Burner used on Mission Water Heaters is the most effective known method of yielding the greatest amount of heat per cubic foot of gas. In the Mission Senior the full effect of the Bunsen Burner heat is absorbed by 8¼ sq. ft of metal in direct contact with water. Ordinary heaters offer but 3½ sq. ft. of heating surface to direct heat action. This plus value of 5 extra square feet of heating surface operates to the user's advantage every minute the burner is on.

MISSION WATER HEATERS ARE ESPECIALLY DESIGNED FOR LIQUEFIED PETROLEUM GASES

Mission Appliance Corporation

MISSION WATER HEATER CORPORATION

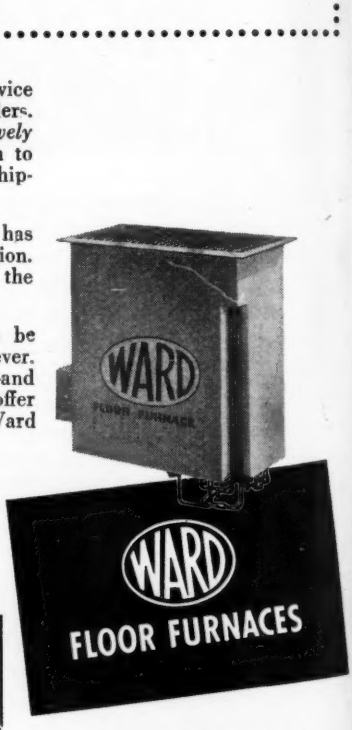
Headquarters PLANT: 7101 McKinley Avenue, Los Angeles, California

WARD PRECISION ENGINEERING MEANS *No "Service Problems"* FOR DEALERS

Comebacks and complaints, requiring extra service calls—are virtually unknown with Ward dealers. The reason: Ward builds floor furnaces *exclusively* —to highest precision standards, then puts them to the most rigid tests before final approval for shipment.

This reputation for "trouble-free operation" has been a big factor in building the Ward reputation. In every area where it is sold Ward is considered the standard of quality among floor furnaces.

For the present—shipments will continue to be limited to our long-established dealers. However, we are "stepping up" our production schedule—and are looking forward to the day when we can offer additional dealers the sales advantages of Ward Floor Furnaces.



WARD HEATER COMPANY
1800 W. WASHINGTON BLVD.
LOS ANGELES 7, CALIF

CORRECTION—In the Ward advertisement appearing in the 1946 Butane-Propane Catalog (pp. 230-231), the B.T.U. Input of Furnace Models 70SP and 70TP is incorrectly shown as 104,400. The current B.T.U. Input is 64,400.

trol corrosion in water pipes. It also has the property of preventing "rusty" water caused by the precipitation of dissolved iron.

Distribution will be through plumbing supply jobbers and dealers. The manufacturer is the Hotstream Heater Co., Cleveland, Ohio, for the No-No Specialty Co.

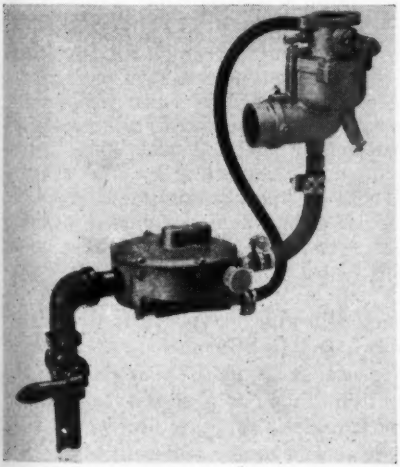
Fuel Control Valve

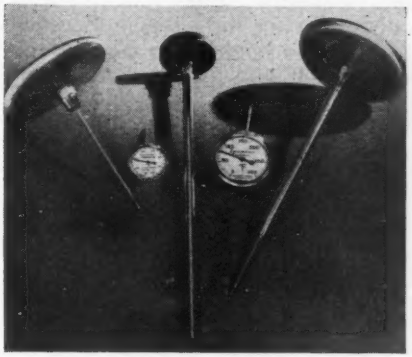
J & S Carburetor Co., 2634 North Beckley, Dallas 2, Texas.

Description: This valve simplifies the conversion of engines from gasoline to gaseous fuels, such as butane and propane. The construction combines the conventional load adjustment, idling adjustment and economizer into a single compact unit. It can be used on engines from the small, single cylinder to the largest multi-cylinder unit. The economizer progressively enriches the mixture at loads above 90%.

It comes in ½" and 1" sizes and is available with or without economizer. Illustration shows ½" valve which has been applied to carburetor used on a small 1-cylinder light plant.

This fuel control valve can be combined with any conventional type carburetor.





Dial Thermometer

Equipoise Controls, Inc., 100 Stevens Ave., Mount Vernon, N. Y.

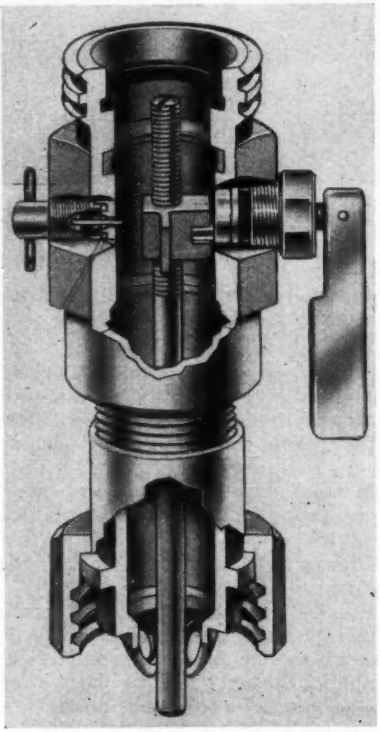
Description: New bimetallic dial thermometer is said to feature permanently-calibrated, highly accurate and extremely responsive precision bimetallic helical coil measuring element having stainless steel case, 18-8 stainless steel connection nut and stem; large, easy-reading numerals and temperature graduations on metal dial; unbreakable glass crystal can be furnished.

Expansion of bimetallic coil rotates attached small shaft and indicating pointer as one unit over entire scale range as the only moving part. There are no pivots, mechanical linkages or gears. Rugged construction is said to protect thermometer against corrosion, vibration, shock and rough handling and to insure long, dependable service.

Various standard ranges are available between limits of —90°F. and 1000°F. Test or laboratory thermo-

meters are graduated in both C. and F. on same scale.

Thermometers are obtainable in 2", 3" and 6" dial sizes. Easily installed by connecting ½" standard connection nut directly into point of service or into separable socket or other type of mounting accessory. Separable sockets are high-pressure type designed for universal service conditions, having 1" or ¾" standard connections.



Unloading Adapter

The Bastian-Blessing Co., 4201 W. Peterson Ave., Chicago 30, Ill.

Model: Rego No. 3118.

Description: The positive action of this unloading adapter makes it safe and practical to pump out LP-Gas storage containers at the user's premises. It may be used to unload liquid from any container which is provided with a dip pipe for the filling connection and which is equipped with Rego valves.

Application: In operation, the adapter is connected to the filler valve and the truck hose is connected to the adapter. The lever is turned, actuating the stem which holds the filler valve open. After unloading, the operating lever is returned to its original position, permitting valve to close.

An open bleeder valve determines whether the valves are closed before hose is disconnectd, and releases pressure confined in adapter body.

Folding Steps

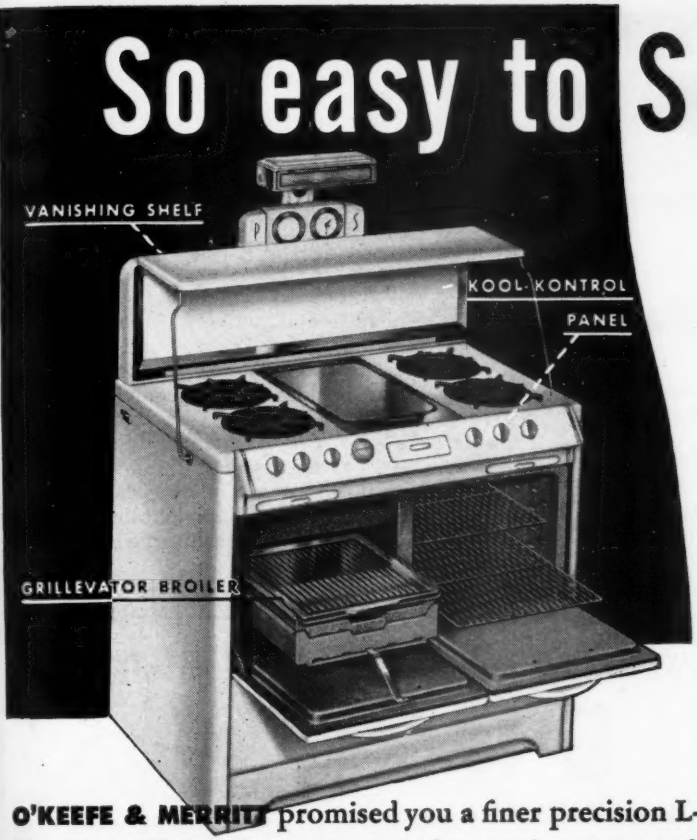
Safety Step Co., 1017 So. La Brea Ave., Los Angeles.

Model: R-16.

Description: Important savings in money, time, accidents, driver fatigue, and a reduction in the number of hernia cases among truck drivers, are claims made for this new quick-acting folding step for motor trucks and trailers.

The manufacturer states that these steps are engineered for use on flat racks, stake bodies, vans, trailers and semi-trailers, and are easily installed with four bolts. Model R-16 is designed for installing on the rear of truck; it may be mounted in center or at either side. In closed position the steps are compactly folded under the truck bed. When the simple trip is manually operated, two sturdy 16-inch slip-proof steps instantly swing down and lock in open position ready for use. A slight lift and push on the bottom step swings and folds them back under the truck bed where they are automatically and securely locked

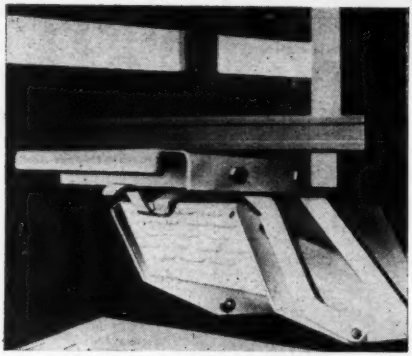
So easy to Sell!



O'KEEFE & MERRITT promised you a finer precision L-P gas range. Here it is! Check the many extra time-saving, step-saving exclusive features! A range that is factory-built and tested solely for use of Butane or Propane. You'll be proud to sell the finest O'Keefe & Merritt ever built.

O'Keefe & Merritt Co.
3700 E. Olympic, Los Angeles 23, Calif.

The New O'KEEFE & MERRITT GAS RANGE



The safety step swings under truck body when truck is in motion.

in closed position out of the way. Another style, Model S-16, is designed for side or "tight spot" mounting.

Body alterations are not necessary to install "Saf-T-Steps." Four bolts securely mount it to the underside of the truck platform, requiring an average of about 30 minutes for the job. They are all metal and built to support a weight of 1000 pounds. They weigh only 40 pounds.

American Pipe & Steel Issues Booklet for B-P Gas Industry

"Liquefied Petroleum Gas Equipment — Distinctively Designed for Storage and Transportation Service" is the title of a new 12-page, standard size booklet on the complete line of products of the American Pipe and Steel Corp., Alhambra, Calif.

Opening pages of this booklet illustrate and describe how this company manufactures a complete line of equipment to serve the liquefied petroleum

. . . BACKED BY MORE THAN FORTY YEARS OF EXPERIENCE

Time-Tested

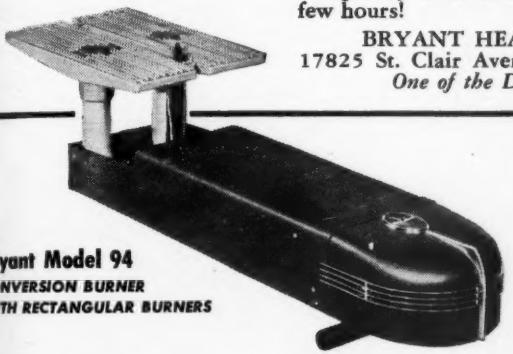
To countless families across the nation the Bryant Conversion Burner has meant relief from old-fashioned heating methods. It has provided healthful, *automatic* comfort.

This unit is *no newcomer* to the heating field. Year after year it has been installed *with confidence* by thousands of families, and dealers have found it to be a product that *sells itself!*

The Bryant Conversion Burner is simple in construction, contains no moving parts which will wear out. Its controls are completely enclosed, yet the control chamber is easily removed for inspection or cleaning. It is completely automatic—simply press the button to start the burner, then *forget it* until the heating season is over!

With the Bryant Conversion Burner, almost *any* boiler or furnace that is in *reasonably* good condition can be converted into a modern, completely automatic gas heating plant in a few hours!

BRYANT HEATER COMPANY
17825 St. Clair Avenue, Cleveland 10, Ohio
One of the Dresser Industries



Bryant Model 94
CONVERSION BURNER WITH RECTANGULAR BURNERS

Bryant Model 94
CONVERSION BURNER WITH ROUND BURNER AND BAFFLES

bryant
GAS HEATING
LET THE PUP BE FURNACE MAN

The most complete line of gas heating equipment in the nation!

gas industry from the production of crude oil to the consumption of the refined product, through the various phases of refining, transportation, and distribution.

Several pages are devoted to illustrating and describing truck and truck and trailer combinations for long distance hauling, as developed for, and in use by, leading operators at the present time.

Information on bulk storage and tank car equipment, made by American Pipe to meet the requirements of bulk and dispensing plants, furnishes valuable guidance to operators.

Generator Turns Cold Water Into Steam in 30 Seconds

A new, steam generator, burning butane-propane gases, is now on the market.

It is a 90-pound steam generator which the manufacturer states will turn cold water into steam in 30 seconds. It develops a capacity of 192 gallons per hour at 180°.

The "Instansteam" is built around the "Thermek" spined copper tubing which has an extremely high rate of heat transfer, and is designed primarily for butane-propane gases, but may be converted easily to burn natural or manufactured gases. It is equipped with a Barber burner which operates at 2¼ to 2½ pounds pressure. The unit develops a full 5 horsepower efficiency.

The generator has a 36-inch high body of "Hevi-Gage" corrosion protected steel and is covered with red, heat resistant "Zonolite" enamel and trimmed with chrome. Insulation is provided by an inner "Zonolite" cast ceramic case. Hydraulic bronze valves are used for fittings.

Reports from owners reveal a wide


IDEAL GAS INC.
SAVANNAH, GA.
HEATING · COOKING · REFRIGERATION
INFLAMMABLE
A
BIG ACE
of The Pack
The keystone in the building of a sound and lasting L. P. Gas business is highly engineered and expertly constructed equipment. Butler L. P. G. truck and transport tank users hold the big ace of the pack.
BUTLER MFG. COMPANY
7410 East 13th Street
Kansas City, Mo.
BUTLER BUILT
L. P. GAS
TRUCK and TRANSPORT TANKS

range of uses for Instansteam from heating water for bathing to cleaning equipment in the oil fields. Main usage, however, has been reported from the various types of farms and ranches where the unit is providing an indispensable service in cleaning and sterilizing dairy and milk equipment, poultry houses, barns, stables, feeding bins and troughs, farm installations, equipment and machinery, fruit trays and canning equipment, hog scalding. Commercially, there is wood bending, dishwashing, bottling and building.

Instansteam is being marketed throughout the United States and Canada by the newly organized James E. Neighbor Co., 4926 East 12 St., Oakland, Calif.

Plans call for a complete system of offices covering every section of the country.

James E. Neighbor, founder of the sales organization, is prominently identified with many successful sales and manufacturing enterprises in the United States.

Gary E. Holm, general sales manager, is prominent in national sales and sales promotion, having served for 15 years with Chevrolet Motor Co., recently as general sales promotion manager.

Ray A. Hemingson to Manage Fuelite Natural Gas Corp.

Ray A. Hemingson has joined the Fuelite Natural Gas Corp. at Lexington, Mass., as general manager. He has had 21 years of sales and operating experience, the last seven years having been with the Philgas Division of Phillips Petroleum Co.

Mr. Hemingson will have his office at the company general headquarters

▲

The "Instansteam" unit—a 90-lb. installation that converts cold water to steam in 30 seconds—is flanked by James E. Neighbor, left, and Gary E. Holm, right. They are president and sales manager, respectively, of the James E. Neighbor Co., distributors.

▼

"AH, wonderful wonderful WELBILTS!"

Here's a dealer who is obviously happy about his future. He's just returned from the Market, all het up about those "wonderful, wonderful, Welbilts" and his L. P. G. prospects.

The future of the L. P. G. market is here today. That's why Welbilt is ready with expanded production facilities (our plant would overwhelm you . . . it is a city in itself), and a distribution plan supported with a sixteen cylinder dealer promotion program.

MORE Welbilt Ranges WILL BE DELIVERED SOONER!

Welbilt Stove Co. Inc. **Maspeth, L.I. N.Y.**

in Lexington, where the company owns its office-display building. He will also supervise the retail Fuelite operations at its branch in Sagamore, Mass., on Cape Cod, as well as the company's bulk plants.

The wholesale activities of Fuelite are under the managership of Raymond Knapp, who will work in conjunction with Mr. Hemingson through the approximate 150 dealers throughout New England and Eastern New York State.

Mr. Hemingson replaced C. F. Dexheimer, who is joining the Shellane organization in New York.

Los Angeles Adopts Code For B-P Gas Installations

A municipal code covering the installation, maintenance, storage, use and transportation of liquefied petroleum gas and equipment has been adopted by the city of Los Angeles and is now being enforced by the Fire Prevention Bureau of the City Fire Department.

M. M. Brandon Advanced By Fire Underwriters' Board

The executive committee, board of trustees, of Underwriters' Laboratories, has promoted Merwin M. Brandon to the position of electrical engineer. Effective immediately, Mr. Brandon assumes full responsibility and direction of the activities of the electrical department of the Laboratories at the Chicago, New York, and San Francisco testing stations.

In September, Mr. Brandon will have completed 25 years of service with the Laboratories.

THE TRADE

Donald D. Williams, of Lincoln, Neb., has joined the water heater sales division of the **A. O. Smith Corp.** and will give technical assistance in the sale of both domestic and commercial water heaters under the direction of James F. Donnelly, product supervisor.

D. D. WILLIAMS

Mr. Williams is an engineering graduate of the University of Nebraska. He did sales engineering work from 1923 to 1943 for the Iowa-Nebraska Light and Power Co., and for a part of that time was in charge of industrial gas sales and installations for that utility.

The Graver Tank & Manufacturing Co., Inc., of East Chicago, Ind., recently announced the appointment of Edward W. Welp to the position of sales manager of water conditioning equipment.

Mr. Welp, former technical director of Graver's process equipment division, has spent 32 years with the firm in every phase of research, design and construction of water conditioning equipment.

Reorganization of the executive staff of the **Moore Corp.**, Joliet, Ill., pioneer producer of stoves and ranges, was announced recently by the Conlon Corp., Chicago, maker of household washers and ironers, which

bought the Moore concern several months ago.

The Moore staff as now constituted includes Harry T. Worthington, vice president and general manager; John M. Foxx, vice president in charge of sales, and Orville E. Oesterle, for 20 years with the Florence Stove, Co., Kankakee, Ill., general factory superintendent. W. A. Stuckey continues as chief engineer and F. E. Wright, in his 41st year with Moore, as secretary. The concerns will operate as separate units, Conlon continuing under I. N. Merritt as vice president and general manager. Bernard J. Hank, head of Conlon, becomes president of Moore and continues as its chairman of the board and treasurer.

Robertshaw Thermostat Co., Youngwood, Pa., announces the return of William D. Mastin, who now becomes Southern representative of the company.

W. D. MASTIN

Mr. Mastin, as a Corps of Engineers reserve officer, was called to duty in the Air Corps in 1941. He was released as a lieutenant colonel in 1946, after seeing service in the China-Burma-India war theater.

Coast-to-Coast Trailer Supply Co., nationwide wholesaling firm with headquarters in Los Angeles, has announced that it is greatly expanding its warehouse space and that it will make its large stocks of LP-Gas consumer equipment available to dealers in the bottled gas field, effective immediately. Heretofore the concern has

wholesaled largely to retail trailer parts stores, trailer dealers and trailer manufacturers.

According to C. L. Davies, co-owner of Coast-to-Coast, the company has 15,000 cylinders on hand for immediate delivery, in small or large quantities. These are of the horizontal type, in 5-, 8- and 10-gallon sizes, equipped with POL and 10% valves.

All are fully-tested and approved by ASME or API-ASME. Other items on hand for immediate shipment are propane and butane-propane pressure regulators, kitchen ranges, and 2-burner hot plates. Other items will be announced from time to time.

George W. Baldwin took over the post of assistant manager of the Pacific Coast division, **Geo. D. Roper Corp.**, on July 1.

G. W. BALDWIN

In his new capacity he will be located in the Furniture Exchange, 1355 Market St., San Francisco. He will work with T. H. Hall, Roper's Pacific Coast division manager.

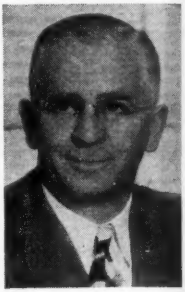
During his long experience with Roper, Mr. Baldwin first occupied positions in the main offices and plant in Rockford. He then served for nine years as sales representative with headquarters in Washington, D. C.

Day & Night Manufacturing Co., Monrovia, Calif., announces the appointment of Frank Spratt as sales representative for the company in the southeastern territory, with headquarters in Montgomery, Ala.

Mr. Spratt, who held a similar position with Day & Night before the

war in the central California territory, replaces Alvin Flannes, who has accepted a position with Cowan Supply Co., the Day & Night distributor in Montgomery, Ala.

Clinton E. Stryker, president of **Adel Precision Products Corp.**, Burbank, Calif., announces the appointment of Ed. J. Towey, of Minneapolis, as sales manager, industrial division.



E. J. TOWEY

Mr. Towey was formerly executive vice-president in charge of sales, engineering, advertising and development of new products for the Diamond Iron Works of Minneapolis, manufacturers of rock crushers and other heavy machinery. He assumed his new duties with Adel on July 1.

The **Neptune Meter Co.** announces that Vincent J. Macklin has joined its staff as sales engineer. Having completed an intensive course in "Red Seal Petroleum and Special Meters" at Neptune's Long Island City school, his territory is the State of Nebraska, with headquarters at the Kansas City office.

A contract has been awarded to **Stacey Dresser Engineering** of Cleveland, Ohio division of Stacey Bros. Gas Construction Co., of Cincinnati, for the design and installation of a propane-air gas plant for the Southern Gas & Electric Corporation, of Sarasota, Fla.

This plant will produce 550,000 standard cubic feet per day of 1000

Btu propane-air gas at 25 PSIG. The plant will be designed for a wide range of 5-100% operation to meet local conditions.

Complete unloading and liquefied propane storage facilities will also be provided. Three 30,000 gallon water capacity propane storage tanks will be installed. The generating equipment will include a Btu recorder and controller.

Advanced design air conditioning and refrigeration controls will have their premier showing at the "4th All-Industry Refrigeration and Air Conditioning Exposition." These new products will be presented by **General Controls Co.**, of Glendale, Calif., manufacturers of automatic pressure, temperature and flow controls.

The exposition starts Oct 29 and extends through Nov. 1 at Cleveland, Ohio.

W. A. Ray, president and chief engineer of General Controls, and J. F. Ray, director of sales, plan to be present. Mr. John Schlemmer, Divisional Refrigeration Sales Manager, will be in charge of the exhibit. Key factory branch managers will also be present.

A new, deluxe edition of "Case Histories of Successful Mass Feeding Installations," published by the **G. S. Blodgett Co., Inc.**, Burlington, Vermont, is now ready for distribution.

In 36 attractively colored pages, 28 case histories are used to depict good kitchen design in institutions, hospitals, schools, industrial feeding, restaurants and hotels. Well known installations are used throughout. Liberally illustrated with kitchen plans and installation photographs, and annotated with data on menus and services, this manual will be of considerable value to architects, designers, and operators of commercial and in-

stitutional kitchens, to dietitians and training schools.

Copies are available upon request to the G. S. Blodgett Co., Inc., 50 Lakeside Ave., Burlington, Vt.

Three sales engineers recently were added to **Warren Petroleum Corp.'s** liquefied petroleum gas division. They are C. L. Hulswitt, who will be in charge of the corporation's new Detroit office; John W. Lesch and Kenneth E. Campbell, who will be located in the Tulsa office.

C. L. HULSWITT

Mr. Hulswitt is a graduate of Purdue University, and formerly was associated with the Michigan Consolidated Gas Co., doing industrial gas sales and engineering work. He also is widely experienced in the manufacture of coal and water gas and is thoroughly conversant with the many engineering problems in connection with the sale and utilization of butane and propane.

Mr. Lesch is a mechanical engineering graduate from the University of Oklahoma, and Mr. Campbell graduated as a petroleum engineer from the University of Tulsa in 1942.

The **Caloric Stove Corp.** has acquired the entire business and properties of the Caloric Gas Stove Works. The business was started in 1890 by Samuel Klein.

The board of directors of the Caloric Stove Corp. has elected the following officers:

Nathan Klein, president; Julius Klein, vice president; Gustav Klein, treasurer, and David F. Kohler, secretary.

With headquarters in the Widener Building, Philadelphia, Caloric's main plant is at Topton, Pennsylvania, where the plant and other properties cover 130 acres.

As a part of their new expansion program the **L. C. Roney Co., Inc.**, Inglewood, Calif., announces the addition of four new men to the staff of the organization. All of these men

ART DENIS

J. E. CLARK

will be key individuals in their plant and will greatly aid in augmenting production.

A. J. Denis joins the company as assistant to the executive vice-president, L. C. Roney. Mr. Denis will be in charge of the plant and his duties will include supervision over tooling, engineering and manufacturing.

He has been directly connected through ownership or management with Carbide Tool Manufacturing Co., Murphy-Denis Corp. and Criterion Tool Co. in Los Angeles as a specialist in tooling production and manufacturing.

J. E. Clark will take charge of industrial relations, production control

and planning. Mr. Clark has had eight years experience in various phases of industrial management. During this time he has worked for Adel, Lockheed, Vultee and Avion organizations, all located in Southern California. He was active during the last war with the California Institute of Technology at Pasadena.

P. E. Curley has been appointed factory superintendent for the Roney organization. Mr. Curley has had many years of active experience in similar positions. Since 1943, he has been employed at the Phoenix plant of Air Research as assistant chief production engineer.

Thomas White joins the organization as supervisor over the newly formed automatic screw machine department. He will have seven of the most modern machines of this type under his supervision. Mr. White's experience includes many years in this specialized type of work. For the past four years he has been employed by the Anchor Coupling Co., Libertyville, Ill., as a specialist in automatic screw machines.

Albert A. Azar has been appointed assistant sales manager of the **Stacey Brothers Gas Construction Co.**, Cincinnati, one of the Dresser Industries. Announcement of his appointment was recently made by A. E. Harvey, vice president and sales manager.

Announcement is made by **American Car and Foundry Co.** that E. B. Carpenter has been appointed district sales manager of the ACF St. Louis, Mo., office. Mr. Carpenter succeeds L. W. Martin, who has retired.

W. E. Zander, director and vice president of foreign operations for **Rheem Manufacturing Co.**, left July 8 from Los Angeles by plane for a

tour of the company's Australian plants. He will visit company operations at Sydney, Melbourne and Brisbane.

Walter S. Rowe, merchandising manager of **The Estate Stove Co.**, Hamilton, Ohio, has announced the appointment of A. M. ("Max") Wyman, for the position of assistant advertising manager.

FELIX L. KAHN

Mr. Wyman's experience, before coming with Estate, included sales and advertising work for a large oil company and a leading finance company; he conducted his own advertising agency in Lima, Ohio, and did important war work with the Westinghouse Electric Manufacturing Corp.

Other Estate announcements include the appointment of Russell L. Schwab as district manager in New York and northern New Jersey; Ned Weinman as service manager, one of whose first duties will be that of conducting a service school for the service managers of the various Estate "Heatrola" distributors; and the return of Felix L. Kahn, son of Albert M. Kahn, vice president of the company, to duties in the sales department at Hamilton, after having spent the past 4½ years as a captain in the U. S. Cavalry.

A. T. Carrow has ben appointed to the management of the liquefied petroleum gas department of **Cribben & Sexton**, Chicago.

CLASSIFIED

Classified advertising is set in 6-point type, without border or display, at the rate of 15 cents per word per insertion; minimum charge per insertion $3. Box numbers for replies count as 5 words. Count as a word each one letter word and each group of figures. Classified advertising is only accepted when payment accompanies order. Copy and payment must reach publisher's office prior to 10th of month preceding publication.

Free to World War 2 Veterans: Situation wanted ad for three successive months.

AGENT WANTED

MANUFACTURERS AGENT — EXCELLENT opportunity for commission agent calling on jobbers and dealers in petroleum marketing and/or L-P Gas equipment. For the past eight years, Rectorseal thread and gasket sealing compound has been universally recognized and widely used in all Mid-Continent petroleum producing areas, and is now available for distribution through established channels to the marketing trade. Exclusive territory and generous commission to qualified party. Give past experience and particulars regarding lines now handled and territory covered in first letter. Rector Well Equipment Company, Inc., 2215 Commerce St., Houston 2, Texas.

SITUATION WANTED

ENGINEER WITH 15 YEARS EXPERIENCE in furnace, commercial and industrial uses of L-P gases, available for developing year round load. Now employed in domestic distribution and appliance installations. Desires change to utilize experience in industrial center. Write Box 760, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, Calif.

GRADUATE GAS ENGINEER desires position with L.P.G. firm. Experienced and capable. State starting salary. Box 770, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, Calif.

BUSINESS OPPORTUNITIES WANTED

FACTORY SALES REPRESENTATIVES—Desire line of gas water heaters for all types gas for states of La., Miss., Ark., Ala., part. Tenn. and N. W. Fla., on commission basis for a large appliance distributor to resell to dealers. A car per month needed or required on contract period of 5 years. Must be A.G.A. approved and complete line. A.A. credit or will pay cash or sight-draft/BL attached. Write Box 780, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, Calif.

BUSINESS OPPORTUNITIES OFFERED

FOR SALE — BUTANE BUSINESS. TWO bulk plants, total storage 15,000 gallons. Four trucks—two are new. Storage warehouse. Retail appliance store and office. Good appliance franchises. Total price $75,000. This is a paying business—if you are not financially able to handle do not apply. Box 790, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, Calif.

EQUIPMENT WANTED

WANTED IMMEDIATELY—Complete bulk delivery truck. Must be late model (K-7 International preferred), but will consider something equal complete with 200 lbs. ASME code tank 1700 to 1800 gal. W. C., pump, meter, valves, hoses, etc., ready to operate. Box 800, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, Calif.

WANTED — SINGLE PHASE, EXPLOSION proof, class 1, group D, 5 horsepower Electric Motor 1200 and 1800 rpm, complete with starter. Skelly Oil Company—Skelgas Division, A. H. Menuet, 605 W. 47th St., Kansas City, Missouri, or LD 296.

WANTED TO BUY—Domestic Gas Meters, any kind. Illinois Electric & Gas Company, Murphysboro, Illinois.

WANTED TO BUY—All types of Propane Plant equipment, tanks, compressors, explosion proof motors, etc. Brantford Engineering & Mfg. Co., 280 Ottawa St. N., Hamilton, Ontario, Canada.

EQUIPMENT FOR SALE

FOR SALE—ONE 18,000 GALLON BUTANE storage tank. Completely fitted and Arkansas inspected and approved. For price and particulars, write DeClerk & DeClerk, Pocahontas, Arkansas.

FOR SALE—1—PRACTICALLY NEW, 1428 gallon, 200 lb. W.P. truck tank with skirting and fittings. Write Box 321, Marks, Mississippi, for details.

FOR SALE—19,000 gallon water capacity used holder, ideal for Butane storage. We have 300 lb. test certificate. Tank is located in the East. Can ship at once. Box 280, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, Calif.

FOR SALE—TANKS: FITTINGS FOR IMmediate delivery. 150 gallon Butane Tanks and fittings, also 250 and 500 gallon Propane Tanks and fittings. For delivery in 30 days—750 gallon and 1000 gallon Propane Tanks and fittings. Kenney Tank Installation Co., 2132 N. Halsted St., Chicago 14, Illinois.

FOR SALE—AIR PROPANE SYSTEM LESS propane tank vapor compressor. Includes one extra 7 by 7 Ingersoll Rand Compressor and one 20 h.p. Westinghouse Class 1-D motor. Equipment located at Central City, Nebraska. Omaha Blaugas Company, Omaha, Nebraska.

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